East England Library

JUNE 4, 1942

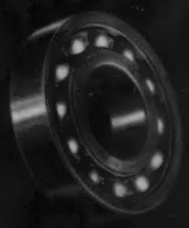
JUN 5 1942

The IRON AGE

IN TWO SECTIONS—SECTION ONE

★ The same standard service ammunition is used in Springfield and Garand rifles, Browning machine guns and Browning Aircraft machine guns.

STANDARD BEARINGS



as vital as

STANDARD AMMUNITION

Ball bearings made to standard dimensions and tolerances can be made much faster than "specials" which require extra tooling, different machine set-ups.

One "special" may well delay delivery of many standard bearings, and the machines awaiting them — in addition to complicating servicing in the field. Consult a New Departure engineer as to preferred sizes. New Departure, a division of General Motors, Bristol, Conn.

New Departure

BALL BEARINGS FOR VICTORY

"Our Specifications called for worm gear drives—our *Experience* called for *Clevelands*"

Look at Clevelands' record in a particularly vital war metal industry—an industry noted for the heavy shock loads it is forever piling on its equipment.

You'll have even greater confidence in Clevelands after *seeing* them at work in this industry's great Mills — and *hearing* the comment of one Mechanical Engineer who has used them for many years:—

"Worm gear speed reducers simplify the transmission of power to our machines, and our good experience has led to the purchase of many of your Units." In fact, this large Corporation ordered a single Cleveland in 1926 and since then has bought more than 50 of them.

Cleveland Engineers will help you plan drives for *your* equipment that will insure the low-cost, trouble-free operation enjoyed by the other Cleveland owners in every major industry.

The Cleveland Worm & Gear Company, 3252 East 80th Street, Cleveland, Ohio.

Affiliate: The Farval Corporation, Cleveland, Manufacturers of Centralized Systems of Lubrication.
In Canada: PEACOCK BROTHERS LIMITED

CLEVELAND WORM GEAR *Speed Reducers*

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in North America and South America, Foreign $15. Vol. 149, No. 23.

JUNE 4, 1942
VOL. 149, No. 23

J. H. VAN DEVENTER
President and Editor
C. S. BAUR
Vice-President and General Manager

o o o

Managing Editor, T. W. LIPPERT
News & Markets Editor, J. A. ROWAN
Technical Editor, F. J. OLIVER

Associate Editors
D. R. JAMES
G. F. SULLIVAN T. E. LLOYD
Art Editor, F. J. WINTERS

Editorial Assistants
M. M. SCHIEN G. B. WILLIAMS
J. I. BUTZNER S. H. BARMASEL
R. E. BENEDETTO

Washington Editor
L. W. MOFFETT

Resident District Editors
T. C. CAMPBELL, Pittsburgh W. A. PHAIR, Chicago
B. W. CORRADO, Cleveland W. F. SHERMAN, Detroit
CHARLES POST, San Francisco

Editorial Correspondents
W. P. DEARING, Buffalo ROBERT G. McINTOSH, Cincinnati
G. FRAZAR, Boston R. RAYMOND KAY, Los Angeles
HUGH SHARP, Milwaukee JOHN C. McCUNE, Birmingham
F. SANDERSON, Toronto, Ontario ROY M. EDMONDS, St. Louis
C. H. BACON, Seattle

o o o

A. H. DIX, Manager Reader Service

o o o

Advertising Staff
Emerson Findley, Robert F. Blair } 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Philadelphia
H. K. Hottenstein, 1012 Otis Bldg., Chicago
R. Raymond Kay, 2420 Cheremoya Ave., Los Angeles, Cal.
H. E. Leonard, 100 East 42nd St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 100 East 42nd St., New York
W. B. Robinson, W. J. Fitzgerald } 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.
O. L. Johnson, Market Research Mgr.
B. H. Hayes, Production Manager.
R. E. Baur, Typography and Layout.

o o o

Member, Audit Bureau of Circulation
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year.
Single copy, 35 cents.
Cable Address "Ironage N. Y."

o o o

Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices	Editorial and Advertising Offices
Chestnut and 56th Sts.	100 East 42nd St.
Philadelphia, Pa.	New York, N. Y.
U.S.A.	U.S.A.

OFFICERS AND DIRECTORS
C. A. MUSSELMAN, *President*
JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE, THOMAS L. KANE,
G. C. BUZBY, P. M. FAHRENDORF,
HARRY V. DUFFY CHARLES J. HEALE

This Week in . . .
THE IRON AGE

Editorial

The Management Bottleneck 47

Technical Articles

Stretch Forming Contoured Sheet Metal Aircraft Parts .. 49
Recovering Light Scrap 54
Casting 500-Lb. Aerial Bombs 59
Reducing Aviation Crankshaft Rejects 61
Silver Brazing Alloys and Procedures 62
Acid Open Hearth 64
Composite Casting by Consecutive Pouring of Two Melts 70
Desulphurization with Acid Iron Slags 70
New Equipment Speeds War Drive 71
New Equipment: Finishing Apparatus 72
Novel Metal Stretching Press 75

Features

Assembly Line 78
Washington 82
West Coast 86
Fatigue Cracks 90
Dear Editor 92

News and Markets

This Industrial Week 94
News of Industry 97
Personals and Obituaries 143
Machine Tool Activity 146
Non-Ferrous Metals 147
Scrap Markets 148
Iron and Steel Scrap Prices 150
Comparison of Prices 151
Finished Steel Prices 152
Warehouse Prices 154

o o o

Products Advertised 194
Index to Advertisers 241

Copyright, 1942, by Chilton Company (Inc.)

★There IS Something you can do to get STEEL more quickly!

Steel deliveries are a problem! Stocks are depleted, mill deliveries delayed, priorities strictly enforced, demands heavier as war production intensifies! But there *is* something you can do about it—several things, in fact! Work closely with Ryerson on your requirements, and follow the common sense rules of action.

1 Make sure of your priority status.

(a) If you are engaged in direct war production and require immediate stock shipments from time to time, be sure to properly extend to us applicable priority ratings. This should be done by extending any blanket rating in the manner required by the blanket under which you are operating or by properly endorsing purchase orders, as in the case of priority ratings based on certificates.

(b) If you are not directly engaged in war production work, check up on the proper rating for your repair and maintenance requirements, because effective after May 4, a new order, amendment No. 4, supplementary to General Preference Order M-21-b, establishes closer control and greater limitations on the distribution of steel.

2 Because of the importance of following Government regulations to the letter, make sure that your orders are formally endorsed, using the proper forms when necessary. This will preclude the possibility of further correspondence that might delay shipment, or prior sale of material.

3 When possible, send orders — not inquiries. This is entirely safe because of the long-established Ryerson one-price policy. It is possible the steel, if in stock, might be sold while we are answering your inquiry.

4 Whenever practicable, state what alternate sizes, shapes, or types of steel you can use if the desired steel is not in stock.

5 It is also helpful to indicate the size or length to which the steel will be cut so that we may fit your requirements to available sizes and lengths when regular sizes and lengths are not in stock.

We are most anxious to help you with every problem of steel procurement or application, during these critical days! Do not hesitate to keep closely in touch with us.

JOSEPH T. RYERSON & SON, INC. · CHICAGO · MILWAUKEE · DETROIT · ST. LOUIS · BUFFALO · BOSTON · CINCINNATI · CLEVELAND · JERSEY CITY · PHILADELPHIA

THE IRON AGE

JUNE 4, 1942

ESTABLISHED 1855

The Management Bottleneck

WE have heard a great deal about all sorts of bottlenecks. That is quite natural in a forced draft economy whose prime objectives must be to meet successfully and satisfy constantly increasing demands which are so large as to defy imagination.

First we heard about the machine tool bottleneck. But that neck has been knocked off the bottle by an eightfold expansion of the machine tool building industry.

Then came the variegated material bottlenecks. Nickel, copper, aluminum, steel and so on down the line. And these, in turn, are being taken care of by a "conservation" program which emphasizes salvage and restricts the use of the available supply to essential purposes.

Just now we are facing the transportation bottleneck. This, too, will be broken before long, thanks to the effective work of Admiral Land and Coordinator Eastman.

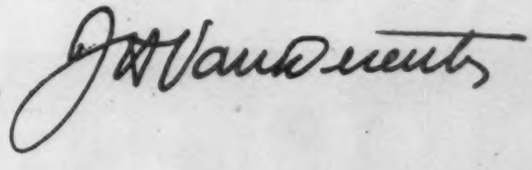
Among other bottlenecks that have been mentioned is that of labor personnel and electric power. But I haven't seen or heard much comment about the impending bottleneck in management.

A bottleneck in management would be a real bottleneck indeed. You can increase productive capacity, develop natural resources, build power plants, train women in industry and turn out new ships and railroad cars much more readily than you can create managers capable of directing these enterprises. We can make new factories out of wood, machine bases and heavy parts of concrete, ships plates and tank cars out of glass, if need be and do it almost overnight, relatively speaking, but it takes 10 years' time and a good man to start with to make a high grade industrial or business manager.

When raw material becomes short, we apply conservation in one form or other and particularly do we seek to avoid unnecessary waste. Why not apply this principle to the most precious and vital war material that we have, namely managerial time?

Today far too much managerial time is taken up in making reports instead of turning out products vital to our war program. Too much of it is taken up in defending industry before investigating committees instead of offending the Japs and Germans on the battlefields. The watchword today, in our armed forces and industry and business as well should be "offense", not "defense."

Today there are more sheets of paper being shipped to Washington from American industry than there are guns and planes being sent to Australia or Russia. A good job of simplification done by a competent efficiency specialist in Washington could conserve managerial time and forestall a management bottleneck.



"Swing Over" Production is Made Easier with the Help of Inland Metallurgists

In these critical days one manufacturer after another must learn, often from scratch, how to make radically new products, how to operate new equipment, how to adapt old machines to new uses, and how to control new processes. They are in the throes of a "swing over" from peacetime manufacturing to wartime production.

Inland metallargists are familiar figures in many of these plants, where for years they have been applying their expert knowledge of putting steel to work for others.

Today, Inland metallurgists are continuing that valuable work. Their technical and practical experience in the selection of steel, in latest fabrication methods, and in speeding up output are helping manufacturers produce for victory.

If you have a problem in the use of steel, call for an Inland metallurgist.

SHEETS · STRIP · TIN PLATE · BARS · PLATES · FLOOR PLATE · STRUCTURALS · PILING · RAILS · TRACK ACCESSSORIES · REINFORCING BARS

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

Stretch-Forming Contoured—

Sheet Metal Aircraft Parts

° ° °

° ° °

. . . Detailed description of the technique, results and limitations of recently developed methods for forming double-curvature airplane skins and other shallow contoured parts by stretching are presented herein. This is another step in the adaptation of high speed forming operations to aircraft production.

° ° °

By T. H. HAZLETT
and
M. M. ROCKWELL
Research Engineers, Lockheed Aircraft Corp., Burbank, Cal.

° ° °

THE development of a method for forming airplane skins and other relatively shallow contoured parts by the process of stretching, to cause them to attain and keep the desired shape has been the subject of considerable research at Lockheed Aircraft Corp. The general principles involved in this method were described in a paper recently presented before the Institute of the Aeronautical Sciences[1] in January, 1942, but it is here intended to give a more detailed description of the various stages passed through in this development, together with the essential points of the technique as it now exists.

In the aircraft industry it has long been customary to form skins, cowling panels, and other parts having double-curvature contours of large radius, by methods which may be classified as hand-forming. Crown rolls, speed hammers, etc., have been used, each part being an individual enterprise requiring considerable labor. Even with drop hammers, a great deal of hand work and intermediate annealing has been necessary, and when contours are very shallow, springback difficulties have been excessive. Of necessity, annealed material has been used in all cases, with the subsequent expense and trouble of heat treating and straightening.

More recently, however, attention has been focused on the desirability of finding a way to form large contoured parts in the heat treated condition. Fuselage and wing skins have been viewed as a particularly important problem, since heat treating such large parts is difficult.

The general principle to be applied seemed to be that of stretching the material into the plastic range while forming it to contour over a punch, thus eliminating excessive "springback." This principle, often applied in the automotive industry, had been applied in the aircraft industry to a limited extent by the use of simple stretch presses.[2, 3, 4 and 5] However, in order to assure rapid and successful operation on a large scale, the following questions needed to be answered:

(1) If the contour is very shallow, must a positive outward stretching force be applied, or can enough stretch be obtained from merely restraining the edges of the material while the punch descends?

(2) If the part is contoured in both directions, must it be *stretched* in both directions, or at least *restrained* in one direction while being stretched in the other?

(3) How can the material be gripped without tearing?

(4) How can wrinkles be avoided?

To investigate the basic principle involved in stretch forming, the Production Research group at Lockheed constructed, in the summer of 1940, a small skin-stretching machine having clamps arranged to stretch the skin in a single direction. *A positive outward force* could be applied to the clamps through the action of a cam mechanism attached to the descending ram of the press to which the wooden punch was attached.

By the use of this simple skin stretcher the desirability of applying the *basic principle* of forming a shallow contoured part by stretching was clearly established. Direct verification was obtained for this assumption, based on the successful use of the stretching machine elsewhere. Stretching need be in only *one* direction even for a skin contoured in *both* directions. However, serious difficulties were encountered in clamping the sheet without causing it to wrinkle or tear at the clamps during forming. Later studies have shown that this is the essential difficulty with this type of equipment.

In the absence of an extremely powerful external force to actuate the clamps, they must be given a serrated or other irregular shape to provide sufficient frictional restraint to hold the sheet; and these irregularities tear the sheet when it attempts to yield locally *within* the clamps in the process of assuming the desired degree of elongation. This fact was sensed at the time, and it was decided to go no further with the mechanical skin-stretcher, as the construction of adequate clamps bade fair to be prohibitively expensive. A version of the skin stretcher usable for forming very deep leading edge sections was developed, but here again the clamping problem became a serious obstacle.

Another reason for shifting the course of the investigation away from the mechanical stretcher lay in the fact that during the experiments on it, observations and calculations were made which indicated that the positive outward action of the clamps was not necessary and that adequate stretching action could be obtained from stretching dies equipped with clamping hold-down plates to restrain the edges of the sheet under the action of the rubber punch in the single-acting hydraulic press. This principle was tried out on several practical parts and found to work quite satisfactorily.

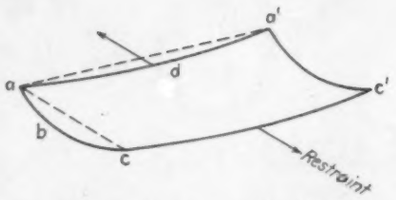


FIG. 1—A typical double-contoured aircraft part. Restraint was applied along the aa' and cc' edges, with the abc edge showing the deeper contour and the ada' edge the shallower contour.

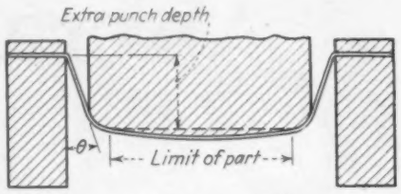


FIG. 2—Forming a shallow contour part by a deep punch.

o o o

It was definitely established that enough stretching could be obtained from simple edge restraint to form even a fairly shallow part, and that restraint in *both* directions is not only unnecessary, but injurious. In other words, parts shaped as in Fig. 1 should be restrained only in *one* direction, which should be parallel to the deepest contour. With reference to the forming of the double contour, it was found that if a part has in one direction a rather shallow contour (ada'), and in the other a deeper contour (abc), stretching of the material by restraining it in the direction of the deeper contour (abc), while the punch is descending, will not only make the sheet assume the contour (abc) but will also make it assume the cross-contour (ada'), assuming, of course, that the punch itself carries these contours. Attempts to rotate the process and restrain in the direction (ada') gave poor results with excessive wrinkling. Additional tests have been initiated to study this phenomenon more fully.

Another expedient that can be successfully used in forming parts of shallow contour is to use a punch deeper than required by the contour, the added depth stretching the material the required amount and the shallow contour being formed across the bottom section of the punch, as illustrated in Fig. 2. To date, no skins have been encountered that cannot be formed successfully by this means. Therefore, it seems unnecessary to give further thought to a possible machine with positive horizontal stretching force.

Double-Acting Press

The development of stretch dies for the single-acting press gave virtual assurance, not only of successful performance of the stretching operation in the double-acting press, but of even better results than those obtainable in the single-acting press. Since installation of the double-acting press at Lockheed, this prediction has been well verified.

The use of the double-acting press in a stretching operation is illustrated in Fig. 3. The punch is attached to the main ram, and there is no female or bottoming die. The place of the latter in supporting the hold-down plates is taken by the heavy rails shown at either side of the punch. The material is gripped between the rails and the hold-down plates which are in turn loaded by the rods passing through the main ram up to the hold-down ram.

The reasons for the superior action of this method are as follows:

(1) Because of the powerful independent hold-down ram, the restraining plates can be made flat and smooth, whereas with the single-acting press it is difficult to exert enough restraint through the action of the rubber punch on the

SECOND of a series of four articles on IMPROVED AIRCRAFT FABRICATING TECHNIQUE developed by Lockheed Aircraft Corp. The first article, last week, dealt with "Drawing Dies for Airframe Stampings," and the two articles to follow are "Forming Convex Flanges and Joggles," and "Hydro-Press Forming With Rubber Platens."

hold-down plates, to eliminate the necessity of beading or corrugating the latter and so introducing a tendency to tear the sheet.

(2) The presence of the bottoming die and rubber punch in the single-acting press set-up gives irregularities of frictional contact and stretching action. In the double-acting press this bottoming or female die is eliminated and the material is stretched quite uniformly by the free descent of the polished and lubricated Kirksite punch.

(3) The variable human element involved in stacking rubber, etc., in the single-acting press is eliminated in the double-acting press. Once the proper amount of "drape" to give the sheet before it is clamped in position has been determined by trial or calculation, this can be marked on all other sheets so that a uniform product results.

The set-up shown in Fig. 3 was made for forming nacelle skins, which heretofore had been formed only in the SO condition and by a time-consuming process of hand rolling. In the double-acting press, the skins were formed in the ST condition at the rate of 90 parts per hr. Fig. 4 shows the perfection and uniformity of a production run of these nacelle skins, and the slight contour in the transverse direction is clearly shown in the profile view.

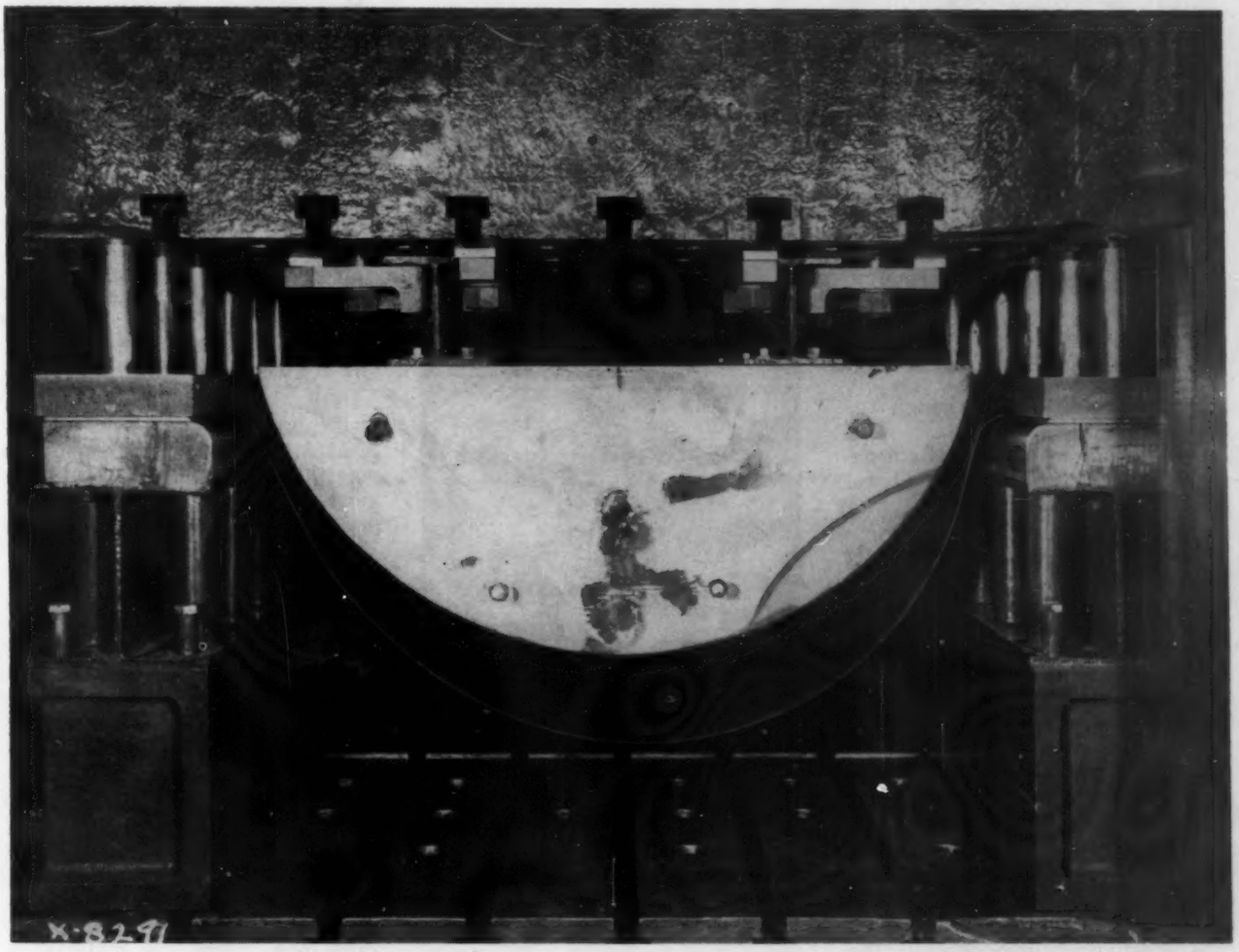


FIG. 3—This stretching set-up in a double-acting press is used in forming nacelle skins for airplanes at Lockheed Aircraft Corp.

o o o

This was a pioneer stretching set-up for the double-acting press. Results were so successful that plans rapidly have been made to form other parts of a similar nature in the same manner. Another early success was that achieved with the forming of cowling panels in ¼H stainless steel, using the stretching set-up.

There seems to be no reason why large fuselage skins cannot be formed by stretching in the double-acting press. It has been found that skins with very shallow contour in the longitudinal direction can be laid in place and fitted by hand, so that it may prove unnecessary to preform these at all. Others of deeper section should respond well to the stretching process, although extensions will be needed on the platen of the double-acting press. A few sections with "saddleback" contour may prove a problem.

Although the present study was undertaken primarily to solve the problem of forming parts of *shallow* contour, such as skins, it has been found that the stretching principle is equally applicable to forming parts which have a *deep*

contour, such as leading edge sections. The only limitation is that the deep contour can be in one direction only. Under such a condition the stretching process is readily applied by "draping" the sheet between the rails in such a way that when the punch descends, it stretches the material just enough to produce permanent set and so eliminate springback, but not enough to result in rupture.

In such a process it is essential that the supporting rails have a large smooth radius and that there is sufficient clearance between rails and punch to avoid severe bending and pinching of the material. If these conditions are complied with, little difficulty is experienced in stretching even quite deep leading-edge sections on the double-acting press.

It is to be noted that the process of forming a leading edge is not "deep drawing," even though the part looks deep. Actually, the part exhibits only a relatively slight departure in form from a cylindrical surface, which could be formed without either drawing or stretching. The latter operations are only required to form whatever *deviation* in contour there may be from a cylindrical or other developable surface. So long as this deviation is slight, as in the case of the skins shown in Fig. 4, a stretching operation is in order. If the deviation should become very great, as in a curved wing tip for example, then a drawing operation would have to be used. The drawing involves compression of the metal in one direction while it is stretched in the other. A typical deep drawing operation is that involved in forming a cylindrical cup, wherein the metal flows inward from the flange into the walls of the cup as the punch descends. A draw-ring is used with enough hold-down pressure to prevent wrinkling of the flange, but not enough to stop the actual flow of the metal inward to the cup. Compressive action occurs in the circumferential direction around the flange as the metal in each wedge-shaped section thereof flows inward toward the rim of the cup.*

* *"Mechanics of Deep Drawing Sheet Metal Parts,"* Aero Digest, *February, 1942.*

No such action occurs in forming parts such as the leading edge, having only *one* deep contour. There is no flow under the hold-down pads; they clamp the metal tightly. A *shallow* cross-contour may be formed simultaneously, as already described; but if the cross-contour were to become deep, the part would become dome-like or ellipsoidal in shape and would then present a difficult problem in deep drawing.

FIG. 4—A production run of nacelle skins. The depth of contour in the transverse direction can be seen in the profile view of the skins.

o o o

It is to be noted that parts which should be drawn are sometimes inadvertently stretched by using too great a pressure on the draw-ring; but this results in premature failure of the material and should not be confused with the stretching process as applied to correctly selected parts.

It is quite possible to use a "stretching machine" in place of the double-acting press in stretch-forming operations. This machine has mechanically or hydraulically operated clamps which grip the sheet while it is being formed by the motion of a punch. No positive outward stretching force is applied to the clamps; hence it does not operate on the principle of the mechanical stretcher tried at Lockheed, but simply on the same principle as the double-acting press. However, without the powerful hold-down ram of the double-acting press, it is difficult to develop a very high pressure in the clamps. As a substitute for high pressure, serrated clamps seem to be in use with most stretching machines in use at the present time. As already pointed out, these tend to tear the sheet within the grips. Of course, it is possible that the clamps could be so designed as to apply enough pressure (10,000 to 15,000 lb. per sq. in. according to work done at Lockheed) to allow the use of flat, fairly smooth grips. In this case, the machine should be the equal of the double-acting press, provided that means can be found for inserting and removing sheets as quickly as can be done in the press.

It might be thought that the possibility of alining the grips in the stretching machine with the direction of the sheet would offer a possible advantage. It has already been pointed out that even for quite deep parts, no trouble seems to be experienced in the double-acting press due to the material bending over the edges of the flat supporting rails, provided proper radii and punch clearance are used.

Technique of Stretching

Tests and observation have revealed that the following factors are important in stretch forming on the double-acting press: (1) Permissible elongation of the material; (2) elongation required to form the part; (3) shape of the rails over which the material is stretched; (4) radii on the rails over which the material is stretched and on the punch; (5) surface condition of the punch, and (6) lubricant used on the punch.

It has been found that allowable elongations in 2-in. gage lengths, as given in the customary handbook data, are not applicable for determining the limits of stretch forming. For example, for 24ST Alclad the Aluminum Co. of America specifies minimum elongations from 12 to 15 per cent, and standard tensile coupons on average material usually show about 18 per cent. However, experience indicated that maximum elongations of only 8 to 10 per cent were being obtained in stretch forming this material.

Accordingly, some tests were

made by stretching strips of material 12 in. wide and 48 in. to 72 in. long, using a polished Kirksite punch. It was found that a maximum elongation of 10 per cent is all that can be counted on in stretching long pieces of 24SO or 24ST Alclad. It requires great care and careful polishing and lubrication to achieve this value; and under practical production conditions it is not considered advisable to try to form any part by stretching which requires an overall elongation of more than 7 per cent for 24SO Alclad and 8 per cent for 24ST Alclad.

Recent experiments with forming the trailing edge of a stabilizer tip have revealed that an overall stretch up to 12 per cent can be obtained by using 61SW; or by stretching 24SO or 24ST about half way, solution heat-treating, and then completing the operation. There is very little difference between the limits of stretching 24SO and 24ST where long distances are involved; but the elongations obtainable from 24ST appear to be somewhat more consistent than from 24SO.

Observations during the stretching tests indicated that elongations as high as 17 per cent were sustained in 24ST material at locations *where it did not come into contact with the punch.* This and other evidence indicates that the major cause for the apparent loss in ductility of the material lies in frictional effects occuring where the material is in contact with the punch. Lateral restraint produced by the punch friction may also introduce secondary crosswise tensile strains which lower the effective ductility.

Some tests on panels 5 x 6 in. in size, compared with results on standard narrow tensile coupons, indicated that the width of the sheet being stretched has little or no effect on the allowable elongation.

It is, of course, necessary to keep the elongations required in forming the part below the limiting values described. Usually an elongation of only a few per cent suffices to produce permanent set. In many cases the part can be "draped" in the press to achieve the desired results, and the amount of "drape" can be calculated in advance from the contour of the part or ascertained by trial and error. Sometimes the part is not so shaped that it can be successfully "draped,"

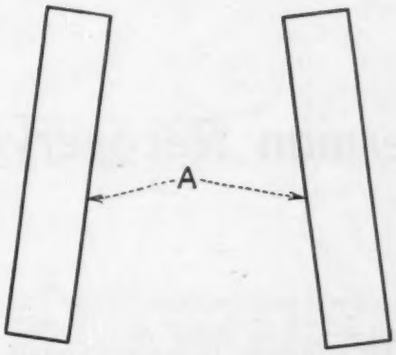


FIG. 5—A plan view of the hold down rails. The edges marked "A" must be straight lines in this view.

° ° °

and in such a case the possibility of stretching is definitely determined by the shape of the part. The use of analytical curves in aircraft design, in place of "faired-in" surfaces, would often greatly facilitate the advance calculation of formability of certain types of parts.

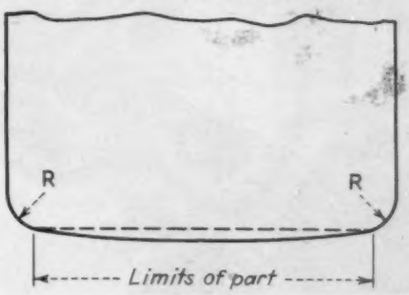
Present information indicates that the rails must, for most work, have straight sides in the plan view as shown in Fig. 5. The inner edges of the rails do not have to be parallel, however, for successful forming.

The radius on the edge of the rails over which the material is being stretched should be kept as large as possible, preferably 1 in. or greater. This is necessary in order to prevent the strains in the sheet from becoming excessively large due to bending around the radius.

When the part is of shallow contour it has to be formed by overstretching by means of an extra

° ° °

FIG. 6—The radii on punches used for over-stretching a shallow part should be 1½ in., as shown in "R" in this illustration.



deep punch, as indicated in Fig. 2. In this case radii of at least 1½ in. are needed on the corners of the punch, as shown in Fig. 6.

Since friction between the material being formed and the punch is such an important factor in the elongation obtainable in the material, it is essential to polish the surface of the punch. The punch used in early stretching experiments was cast lead. Results from this material were not very good, and it proved necessary to form the punch of Kirksite with a good polish.

The need for a good lubricant for this type of forming, as well as for deep drawing, is well recognized. The extreme pressures encountered in drawing are not present in stretching, so that most of the better drawing oils will serve satisfactorily as long as they do not break down below 150 deg. F., and will provide viscous lubrication up to about 5000 lb. per sq. in. normal pressure.

Experience to date indicates that material should always be restrained in one direction only, parallel to the deepest contour to be formed, as indicated in Fig. 1. Further study is being given to this subject. As emphasized, the hold-down pads and rails should have flat, almost smooth surfaces. No serrations or corrugations should be used.

Stainless steel is well adapted to the stretch-forming process, even the ¼ hard temper being capable of sustaining at least as much stretch as 24ST. The annealed material will stretch quite extensively. A better grade of lubricant, however, is needed in some cases, than for Alclad materials.

Bibliography

[1] "Elastic Theory as a Tool in Sheet Metal Forming Problems," F. R. Shanley. Paper presented at the annual meeting of the Institute of the Aeronautical Sciences, Jan. 28 to 30, 1942.

[2] "Junkers Stretching Press Technique," *Aircraft Engineering*, April, 1937, and August, 1940.

[3] "German Production Equipment," *Aircraft Engineering*, K. Frydag, October, 1940, p. 314.

[4] "Men and Machines," *Automotive Industries*, April 1, 1940.

[5] "Special Machines Designed for Flexibility in Aircraft Production," H. A. Berliner, *Aero Digest*, January, 1939.

[6] "Cutting and Forming Sheet Metal Parts," *Aero Digest*, January, 1939.

[7] Pressings in Aeroplane Construction," E. J. Ritter, *Luftwissen*, Vol. III, 1938, No. 7: *Aircraft Engineering*, February, 1941.

German Recovery of Light

CARRYING on a total war has not been a recent notion of Germany's, and both industrially and economically, the country began adjustments for such a project years ago. These adjustments have been proclaimed at various times both in Germany and abroad, and some of them, especially those of an industrial nature, might be considered by the American plant operators.

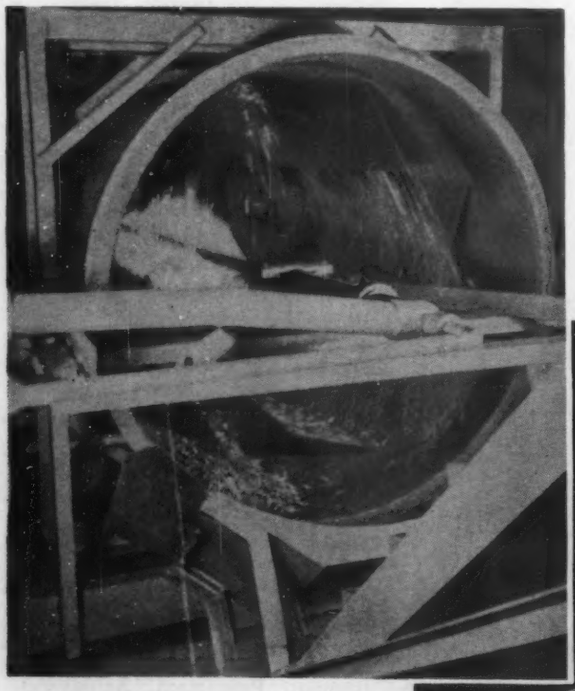
Germany has made an especially concentrated effort to conserve materials with which to carry on the war, one of the most interesting of which has been the reclamation of light metal scrap, both magnesium and aluminum. A process for the recovery of aluminum scrap, discussed by H. Schiek and H. Walbert, German technicians, points out that the production of new aluminum in Germany could not possibly keep up with the ever increasing demand, and therefore efficient scrap recovery was of growing importance. Furthermore, it was felt that recovery should be so effective in the German plants that the secondary metal would be equal in quality to the virgin aluminum.

The operation of one recovery plant was completely described. With the best modern scientific and technical equipment available, this plant was converting aluminum and aluminum alloy turnings into useful alloys at very slight losses in metal. The recovered metal proves equal in quality to new material, and, since turnings are a considerable item in light metal scrap, their complete recovery is possible. Heretofore, recovery from turnings has been incomplete, due jointly to the lack of modern equipment and inexperienced operation. The inexpert operation of the recovery process means not only high losses by oxidation and low metal recovery, but also an inferior recovered product, to which the addition of virgin metal may mean a waste of good metal.

Scrap Recovery Process

The aluminum recovery plant described, apart from chemical and metallurgical laboratories, has a chip breaker, centrifuge for disposing of oil on the turnings, a drying drum, a magnetic separator, a charging machine, and a melting furnace. These separate installations are interconnected by material handling devices, and as many of the operations as possible are completely automatic.

o o o



BELOW

FIG. 1—After leaving the centrifugal dryer, the aluminum chips are passed up this automatic conveyor into a furnace dryer where moisture is removed down to traces.

o o o

ABOVE

FIG. 2—The gas fired drying chamber of this furnace keeps revolving and catching the chips in longitudinal panels seen in the barrel. This agitation keeps the chips from burning, and aids in the drying.

Metal Scrap

. . . A method of converting scrap aluminum turnings and chips into high grade usable metals, and the recovery program for aluminum and magnesium alloy scrap carried out in two German piston manufacturing plants are described herein.

The operation of the plant itself involves rather unusual operating practices. The turnings are collected for recovery and carefully weighed so that a loss and gain budget can be calculated at the end of the process. In handling and storing the turnings, they become interlocked and form firmly connected bales. For convenience of mechanical conveyance, these bales are passed through gyratory crushers that break the turnings down into small chips. The crusher is charged at the plant floor level so that one man can serve the machine adequately, and simultaneously do some rough sorting, such as removing wood, paper, rags, etc.

Following the crushing operation, moist or oil bearing chips are charged into a centrifugal drum where excess moisture or oil is removed. The oil that is separated from the chips by the centrifuge is recovered. After this first drying, chips are then conveyed by a screw feed to a drying drum furnace shown in Figs. 1 and 2, where the remainder of the moisture is removed, down to traces. This furnace is arranged horizontally and heated centrally through a hollow shaft by a gas burner.

Guides in the furnace conduct the chips through the drum, forcing the metal to fall continuously on the free space where it is surrounded by hot furnace atmosphere, as illustrated in Fig. 2. The heating is adjusted in such a manner that the chips, when removed, will contain 1 to 2 per cent moisture, because complete drying entails the danger of overheating and possibly burning the chips.

This furnace drying creates considerable dust, which, with the water and oil vapors, is conducted through a suction pipe into an exhaust chimney. To avoid the loss of chips through the draft, a sifter, probably of a baffle type, is installed in the chimney, and is regularly removed and emptied of accumulated material.

A magnetic separator, Fig. 3, is used to remove ferrous admixtures in the aluminum turning scrap. For successful removal of such impurities from the turnings, the particles of scrap are kept at a fairly uniform size; the scrap is dried carefully; and there must be an optimum distribution of the material over the separator. The turnings are distributed evenly over the separator by a screw feed in a drum that forces them out on to an oscillating surface of sheet steel. From this oscillating table, the chips progress over two permanent magnet rolls arranged one below and behind the other. This arrangement insures uniform flow of metal, steady and smooth feeding of chips, and the retention of all iron admixtures. However, care is taken to prevent the scrap from falling too vertically, so as to eliminate the possibility of having the chips bound, with the resulting incomplete removal of iron.

Freed of iron and steel, the chips progress to the melting furnace. As hand charging requires about 15 to 20 min. per ton, during which time the gas in the furnace must be throttled with resulting temperature drop in the furnace and the rapid deterioration of the refractory lining, all charging is automatic. Charging time is reduced to 1 or 2 min., reflecting corresponding reductions in labor costs, heat losses, and time losses. The driving mechanism of the rotating drum type furnace charging machine is placed as low as possible to remove it from the area exposed to high heat radiations.

Melting

Fine turnings and chips, since they have large surface areas entailing the danger of burning, are

o o o

FIG. 3—For removing the ferrous inclusions in the aluminum scrap, the chips are passed over these magnetic rolls. The feeder to the rolls oscillates laterally in such a manner that it evenly distributes the chips over the rolls.

o o o

FIG. 4—The variety of threads on this part made entirely from aluminum scrap remelted bespeak the quality of the recovered metal. German metallurgists claim that the recovered metal is in no way inferior to virgin aluminum.

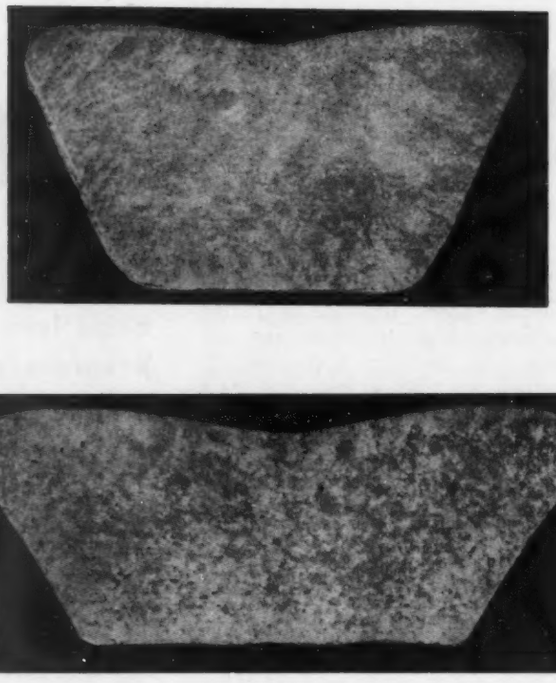


FIG. 5—Above shows the fine grain structure of the aluminum recovered from turnings when the recovery processes are carefully controlled, while below shows the coarser and inferior grain structure of an ingot recovered from scrap but with the recovery processes not controlled so rigidly.

melted under a salt blanket. Furnace rotation permits immediate protection by the salt cover to the metal. On charging, an excess of salt is maintained and the caloric reserve of the bath is sufficient to prevent any marked cooling down of the furnace because of the cold chips. Since there are traces of oil and dirt in the scrap charge, the salt becomes viscous and must be renewed after every five melts. Although there is a considerable consumption of salt in the bath, the higher cost of working with a salt blanket is more than offset by the higher yield and better quality of the product.

Mechanically enclosed metal particles can be recovered by breaking and grinding the slag cake; aluminum oxide is recovered by leaching and filtering; and finally, some of the salt is recovered by concentration and evaporation of the solution. The latter conservation is vitally important since the low temperature melting salts commonly used are expensive. Attempts are being made by German technicians to recover the salt, and if successful, the complete cycle will permit much greater economy. Further evidence of the measures of stringent economy in the German plants is the recovery of vapors carrying salts and particles of scrap metal that are caught in the flue exhaust filter. After melting in the furnace has been completed, the metal is cast into a movable trough and then into settling or alloying furnaces.

Continuous metallurgical supervision of the entire process is maintained. Throughout the plant, metallurgical stations and testing depots insure that mechanical and manual operations proceed according to very strict schedules.

The aluminum recovered from the scrap turnings by the process outlined is claimed to be free from inclusions and gases, well condensed, and very high percentages, by weight, are reclaimed. The part shown in Fig. 4 was made from secondary metal produced from dross, the worst scrap obtainable. The variously pitched threads evidence that the metal is of high quality and fulfills considerable requirements. Density and excellent grain structure of metal recovered from scrap by the described method is shown in Fig. 5, above, while Fig. 5, below, shows a sample recovered from remelted aluminum scrap, but without particular care being taken in the re-melting and the equipment used was not according to the standards observed in the plant described. Consequently, neither the grain structure nor the density of the sample is particularly desirable for further working into fabricated parts.

Magnesium Recovery

Another article, by Dr. E. Meyer-Raessler of the German Electron Works, describes the conservation and scrap recovery program for magnesium, aluminum, and light metal alloys as carried out in a plant that manufactures pistons for internal combustion engines. The author claims that the great density of population and comparative scarcity of raw materials in Ger-

Reclamation and Conservation of Metals

. . . This is No. 5 of a series of articles designed to aid industry obtain the utmost value from every pound of metal.

many naturally focussed attention on the most frequent metals, aluminum, and magnesium, many years ago. However, it was only when the German economy was reorganized and redirected after World War I that use was made of these metals.

In 1921, cast iron was replaced as piston material by magnesium, and in 1925 magnesium die casting was introduced. In the same year, the first magnesium cast airplane wheel was produced in Germany, replacing the usual wire spoked wheels.

The process of metal conservation described by Dr. Meyer-Raessler is in use at the Mahle, K. G. and the Electron, G. m.b. H., plants at Stuttgart, Germany. It is designed to conserve the raw materials used only in the manufacture of light metal pistons, and recovery of the scrap from this product is complete.

Apparently there have been objections in Germany to the use of light metal scrap, but it took Professor Guertler of the German Four Years' Plan organization to show that precise laboratory supervision and good care in handling and processing would produce a recovered metal that was in no way inferior to virgin metal. Magnesium and magnesium alloy scrap have always been melted and re-used to a large extent, but only recent research made the recovery of aluminum scrap possible.

Naturally, in the manufacture of pistons, neither aluminum nor magnesium is used as a pure metal, but is always alloyed with copper, nickel, silicon, or some other agent that produces desired physical properties in the metal. However, some of these alloying elements are only available in a limited degree, and must therefore be used as sparingly as possible. While it seems strange to Americans, one of the main reasons for conserving light metal scrap in Germany lies in the recovery of the alloying elements. However, the war calls for a widened economy of metals in Germany, and recovery of the base light metal is becoming as important as the recovery of the alloying materials.

In the German piston plants, metal is received in the alloyed state, ready for forming into pistons. In order to differentiate between the stocked alloys, they are designated by colors. For example, bars of alloy EC 124 are marked blue and EC 138 bars are marked white. Also, letter and number symbols are shown on the material to indicate laboratory analyses.

Wright Aeronautical Corp.'s Metal Segregation System

DETAILS of the Wright salvage plan for vital steel, aluminum and other high grade materials segregates the various metals as fast as they are removed from forgings and castings by a machine tool. Machine tools ranging from small boring machines to massive turret lathes have bins attached which catch and hold all shavings and chips produced, and since "in-line" production methods are employed, where a tool is used for one specific part only, the same kind of scrap always accumulates.

Salvage collectors wheel large boxes along the aisles of the plant and collect the waste. To provide a foolproof method of keeping various alloys separated, the bins on the tools are each marked with a color for a specific grade of alloy, and the collectors' boxes are similarly marked. Thus, a collector gathering steel, identified by a green and yellow mark, gathers the shavings and chips from every machine tool bearing a green and yellow card.

Although steel, aluminum, and magnesium are the principal metals salvaged, the list also includes copper, beryllium bronze, phosphor bronze, aluminum bronze, brass and a variety of others. Monitors throughout the plant enforce strict observance of the salvage procedure regulations, and the same control of salvage has been applied to all non-metallic products.

The pistons manufactured are both forged and cast. As would be expected, cast pistons are produced directly from the ingot by casting the melted metal into the semi-finished part, as shown in Fig. 6. The forged piston, however, passes through a number of shapes being worked down to the semi-finished state. The forged pistons, being more ductile and having higher physical properties than the cast part, are used only on heavy duty motors. The semi-finished pistons, either cast or forged, are collected in batches for finishing, being stacked until finishing can be done. Special reserves of off-size semi-finished pistons are maintained.

Both casting and forging result in scrap. In casting, gates and risers are cut off, and in forging, the cropped top and bottom ends are scrapped. Furthermore, during sawing and rough turning, scrap is produced. As work on the pistons progresses, through the semi-finishing and finishing operations on highly specialized machines, additional scrap and chips are produced. In Table I is shown the weight comparison between semi-finished and finished pistons and the scrap. The scrap resulting from the manufacture of pistons amounts to several tons per month, but care is taken to insure against loss of even the most minute chip. To save the turnings, all machines are equipped with catchers and every operator is responsible for the clear separation and collection of all turnings according to their composition.

Since these plants produce a variety of types of pistons, a great many different materials are required and it cannot be avoided to work on a variety of materials in succession on a single machine. It therefore becomes quite a problem for the machine operator to keep different light metal alloys segregated. However, this is the responsibility of the operator. Departments working with ferrous mate-

TABLE I

Relation of Weight of Semi-Finished and Finished Piston to Chip Losses During Manufacture

Type of Piston	Semi-Finished Weight, Oz.	Finished Weight, Oz.	Chip Weight, Oz.
Cast pistons:			
74 mm. diameter	8.85	6.24	6.14
105 mm. diameter	63.49	52.03	11.46
Forged pistons:			
63 mm. diameter	18.48	12.34	2.61
105 mm. diameter	61.02	40.39	20.63

rials are separated from the rest of the plant so the iron content of alloys recovered by this careful supervision of individual machine operations can be kept low, less than 0.4 per cent. This is low for the variety and volume of materials handled. The careful segregation and control of scrap accumulation in addition to care in remelting permits the production of high grade magnesium ingots. Fig. 7, above, is an example of an ingot with an iron content of about 1 per cent, introduced by careless segregation of metal while Fig. 7, below, is one from scrap collected by the method described, showing fine grain structure, with iron content less than 0.4 per cent.

Laboratory supervision of material doesn't extend only to turnings, sawing, filings, rejects and their efficient use, but also embraces the whole raw material and metal cycle from the time the material enters the plant. By continuous chemical analysis of all supplies and products, maximum uniformity is assured, but continuous control of scrap is vitally important as it is here that the most likely source of impurities occurs.

Apart from chemical composition of materials and scrap, the physical qualities of the raw materials and finished products are closely checked and controlled. Test stations throughout the plant keep close tabs on the product in its various forms of manufacture and on the waste of the processes. Defective parts may be rejected almost as quickly as the defect occurs because of the staggered system of control stations, and recurrence of a defect can be avoided.

Recovery of magnesium and aluminum scrap produced by the manufacture of the pistons in these two plants goes much further than the plant itself. Foundry slag, permeated with metal, is sold to smelters for metal recovery. The smelter recovers this metal, classifies it as second or third grade metal, and returns it to the plant.

Another rather startling example of the lengths to which Germany is going to get efficient and economical recovery of scrap is the following. Normally, throughout the nation in repair shops, garages, automobile factories, and aircraft repair hangars, motors are taken apart, pistons removed and replaced. Such parts are not sold to scrap dealers to be sold to any light metal fabricator who might make crank cases or cooking sets, or to a plant where full use of the potentialities of the material could not be made. Insofar as is possible, the used and discarded pistons are returned to the works in which they were manufactured, so that full use of the metal itself and its alloying elements can be made. Another advantage of such a program lies in the continuous control that can be exercised regarding the performance of the completed product. Hence by the systematic return of scrap from within and outside the plant, many tons of virgin metal are saved and made available for re-use in the fabrication of materials that are best fitted to the particular light metal or its alloys.

In concluding, Dr. Meyer-Raessler pointed out that the economies exercised throughout these two piston plants do not end with rigorous control of the material cycle, but the material employed for a given product is subjected to continuous research so as to avoid the use of scarce metals and materials as much as possible. For example, the use of alloy EC 101 with 10 per cent copper was recently discontinued in favor of the EC 124 alloy with only 1 per cent copper. The research is directed toward finding alloys that are entirely composed of domestic raw materials, but with no loss in quality. The technical and commercial success of these plants is claimed to be the result of extreme economy and efforts are being continually directed toward widening the margins of savings.

The foregoing data show that Germany, in spite of the comparatively large magnesium and aluminum production, has gone a long way toward establishing efficient methods of dealing with light metal scrap produced both in fabricating plants and throughout the country.

ABOVE

FIG. 6—The magnesium alloy piston casting. Gates, risers, and other scrap from this cast form are carefully collected and segregated for remelting.

o o o

RIGHT

FIG. 7—Above is shown the coarse structure of the grain in a magnesium ingot containing 1 per cent iron, caused by lax control of the segregation of the metal going into it. The metal is brittle and difficult to machine. Below is an ingot containing 0.4 per cent iron. It has a very fine grain structure and was produced from carefully segregated scrap and the remelting process was rigidly controlled.

Casting 500-lb. Aerial Bombs

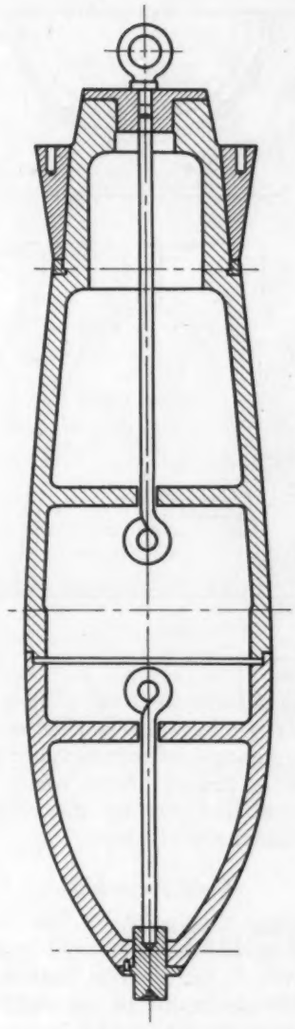


FIG. 1—Patterns are made of 1-in. thick duralumin.

° ° °

CAST steel aerial bombs are made in a number of British foundries, using all the recognized casting methods. Some are made on the flat, some nose-up, and others nose-down. The method described here is the latter one as applied to the 500-lb. bomb. This choice has been made, not necessarily because it is either the cheapest, or the quickest, but rather because it is "extremely reliable." On the other hand, casting on the flat is in many ways better for mechanized production. The foundry where the method was originally created, though still using hand methods, is getting a very high production per square foot of shop floor, according to the British *Foundry Trade Journal*, in which this report on the process originally appeared.

The pattern, shown in Fig. 1, is made of duralumin, or the like, in two halves, having in general about 1 in. thickness of metal. Internally there is a reinforcing plate, through which passes a steel eyebolt for its withdrawal from the mold. The contraction allowances are adjusted to meet those actually encountered in the foundry, because there may be a slight variation according to the steelmaking process used. So made, the patterns, though subject to rigid inspection, are giving excellent service. The corebox, also made in duralumin, is constructed in three sections, as is shown in Fig. 2, provision being made in the drag for seating the core bar.

Core Making

The core barrel is constructed from 2⅜-in o.d. mild steel tube perforated with a quantity of ⅜-in. diameter holes. It is wrapped on a simple treadle lathe with coarse straw rope. The practical minimum amount is one and a half layers, the half, of course, corresponding to the region of maximum diameter of the core. After winding, the barrel is charred over a brazier to eliminate the straggling end-bits and the natural waterproof oils, which the surface of straw carries, so as to obtain good adhesion with the loam sand. Before doing this, however, the barrel is taken to a bench, where the end is plugged and a ferrule fitted. This ferrule is destined to become integral with the nose of the casting and to be machined out. On the end of the ferrule is force-fitted, by means of a short length of lamp wick, a cap, which is salvaged and re-used. This assembly is shown in Fig. 3.

The core barrel is then centred in the corexbox, visual control being sufficient to keep it vertical while ramming up with sand. After drying, the cores are either painted by hand or sprayed with a mixture containing silica flour, core cream and bentonite. A simple device is usually constructed for transporting the cores in pairs or groups to the molding floor by overhead crane.

Casting Methods

It is obvious that special attention must be paid to the box parts, as the knocking out of the bombs involves fairly rough usage. The writer sometimes wonders whether a simple knocking-out machine, built on somewhat similar lines to a steel plant ingot mold stripper

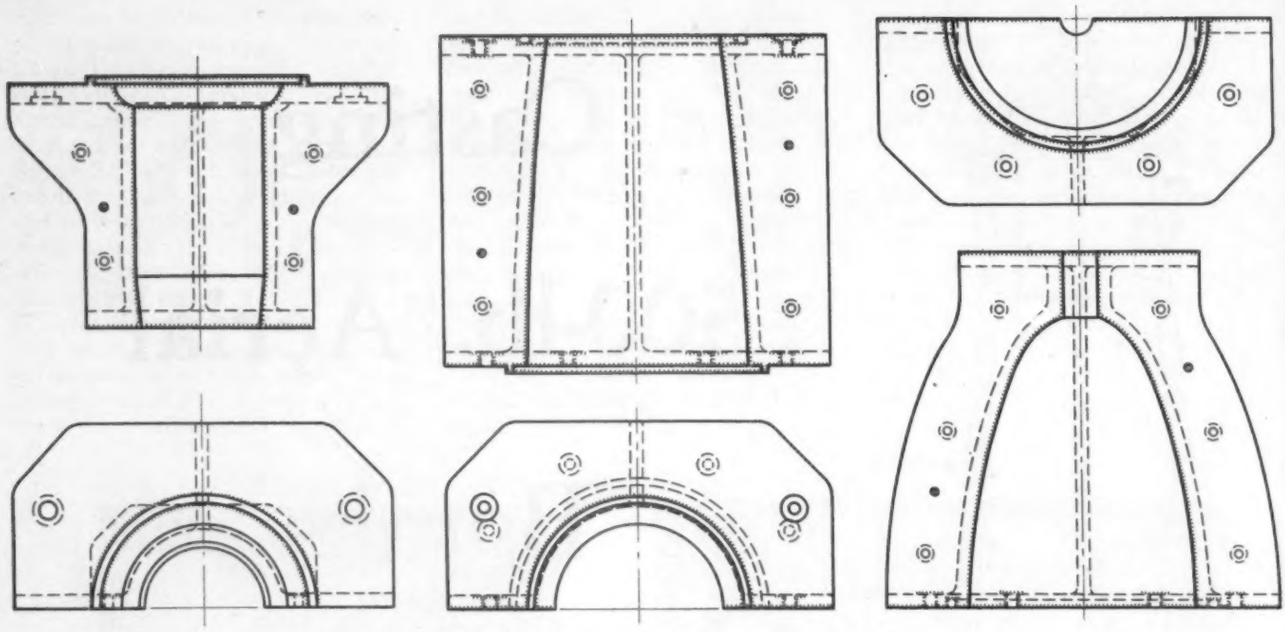


Fig. 2—The corebox is divided into three sections.

could not be devised for foundry use, where but few sizes of boxes are constantly reused. The boxes used in one foundry are shown in Fig. 4, from which it will be seen that though the bombs are a two-parted job yet the method uses three boxes, two for the bottom half and one for the top. Alternately, the top half can be constructed of three boxes of the type used for the bottom half.

Fig. 4, discloses in fair detail the casting method followed. On a board are set the pattern, the two horn runners, and four sockets. These sockets are used instead of box pins for alining the top and bottom halves of molds. The cope carries a ball joint. When ramming reaches the top of the pattern, a fire-clay ring is superposed on it automatically centered, and any distance between that and the top surface is built up with packing. At a point between the end of the down runner and the pattern a large brad is inserted to reinforce what would be a weak spot. A grid is bolted to the box, which is rolled over, and the surfaces are cleaned up.

The top half pattern having been set in position together with the ball joints, the cope is lowered and the common down-runner stick for the two horn runners set in position. A "T" gage is used to set the depth of the core in the drag, and the mold is rammed. The mold is now taken apart and the sections of the pattern removed. When the job is properly in production no nailing should be required, but it is advantageous at points where the metal strikes against the core in the experimental stage.

o o o

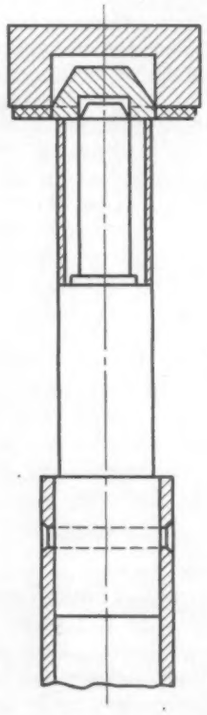


FIG. 3—Ferrule assembly with a protective cap fitted to its top. The ferrule becomes integral with the casting and is machined out.

Mold Assembly

Among the points to be noted when assembling the mold is that the core is centered at bottom by the ferrule on the barrel and by a clay ring in the mold. It is centered at the top by a gage having three arms carrying distance pieces set at 120 deg. or by two semi-circular gages fitting in the head portion. The correct height of the core is fixed by a shoulder gage working from the mold joint. This method implies that the core barrel is not fastened down but is left free to expand. Fig. 4 shows clearly that the shoulder of the core is clamped down. Naturally all details such as assembly, size of runner box and speed of running are all standardized.

A description of a hand method has been given because it discloses conditions which can be applied to mechanical production by the Sandslinger or on various types of molding machines. The job, though relatively a simple one, is not foolproof, and constant attention needs to be given to the core so that it retains its permeability and collapsibility without being mechanically too weak.

The fettling on the 500-lb. cast-

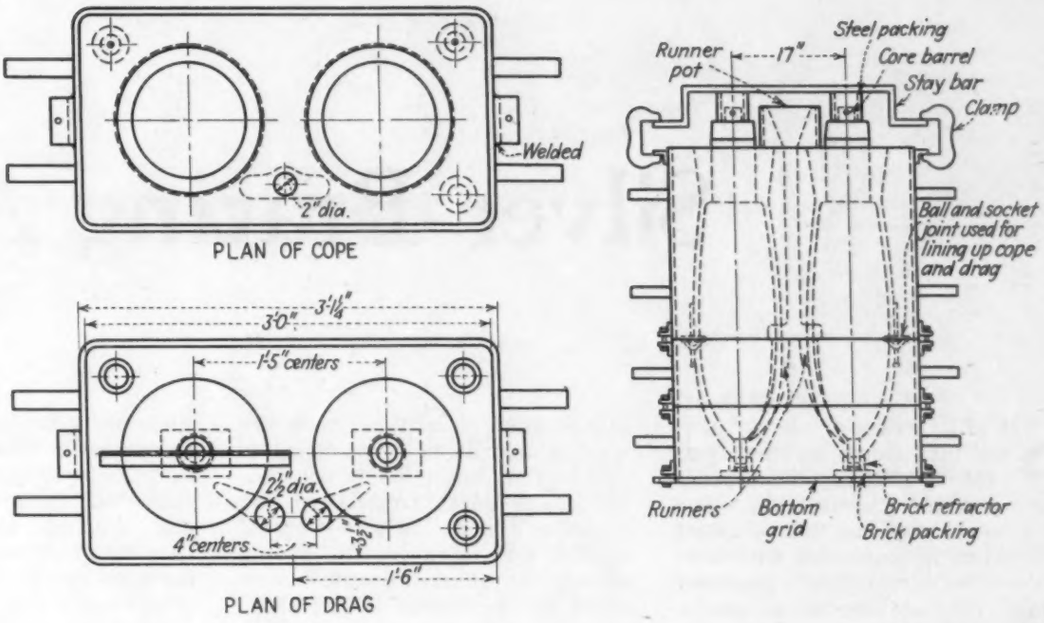


FIG. 4 — Two bombs are cast nose-down in a single mold. The upper plan view shows the top of the cope; the lower illustrates the top of the drag, which is made in two sections.

ing presents little difficulty, as the apertures are sufficiently big to insert portable grinders and other tools. The inspection is pretty severe, especially as to concentricity, and the vertical method of molding and casting nose-down does seem particularly satisfactory in this respect.

Reducing Aviation Crankshaft Rejects

THE salvage committee of Ohio Crankshaft, Inc., Cleveland, is saving upwards of 60 per cent of material that might otherwise have been scrapped had final disposition of the pieces been left in the hands of the floor inspectors, according to L. R. Calaton, chief inspector of the company. This is in no ways a criticism of these inspectors. It merely reveals with what effectiveness a board of production inspectors can work to increase the efficiency of an inspection and machining procedure.

Somewhat over a year old, this plant is producing two-throw crankshafts for 1700 hp. aviation engines. The machining of these pieces is a precise operation and inspection specifications are rigid. Work of the salvage committee did much to put production in the new plant on schedule by quickly ascertaining machining irregularities, by education of operators, and by maintaining knowledge of a reject as it passed along the line towards final correction. Further, the presence of the committee has been a psychological stimulant to the workers who do not want any "scrapped" work of theirs to be hailed before the board for discussion.

Meeting daily, the committee is composed of the production manager, the plant chief inspector, the engine assembly company inspector, and the army inspector. In addition, there are four departmental foremen, and in isolated cases, an operator or a floor inspector. This salvage board is a particular development of the company designed to fit the specialized job of turning out these precise aviation crankshafts. It makes for proper balance between production and inspection.

To each piece designated for salvage is attached a yellow, "Send-to-Salvage" tag. On it the floor inspector puts complete numerical data as to sales order number, lot number, part number, etc., and a concise account of the defect. Production foremen are notified before material goes to the salvage depot, so that they may see the work and reclaim it if the variation is not excessive. They must sign the tag, however.

The tag, printed with standard instructions, easily checked off to reveal nature of irregularity, stays with the piece until it reaches final assembly. This occurs, of course, in cases that have been corrected some place along the machining line and enables all operators to handle the piece with particular care.

Procedure at the salvage committee meeting is to take each part individually, study the extent of the error, and determine whether it is an error which additional machining will correct satisfactorily, or one that definitely consigns the part to the scrap pile. So far the combined machining experience of the committee has resulted in reclamation of many parts that might have gone to scrap. The committee is presided over by the production manager whose decision is usually final on salvage matters.

Presence of the salvage committee has developed a friendly competitive spirit between the four major departments in the plant. Considerable effort is made to keep rejects to a minimum and the department that fails to hold down comes in for its share of criticism.

Silver Brazing Alloys a

SILVER brazing alloys have melting points varying from 1175 to 1652 deg. F., depending upon their composition. For this reason they find their greatest usefulness in connection with nonferrous metals such as copper and brass. They are also well suited for use on steel assemblies which do not lend themselves to furnace brazing, or where, as in the case of stainless steel, it is desirable to braze at lower temperatures.

Silver brazing alloys are basically brazing spelter (60 copper—40 zinc) which have been modified by the addition of silver or other alloys to obtain lower melting points, improved fluidity, better melting properties, and higher strength. For the majority of cases, the alloys listed in the table meet most requirements.

Design of Joints

As in copper brazing, silver brazing alloys should not be used as fillers or on "V" joints. They flow freely into narrow openings, and the strongest joints are obtained with small clearances.

Shear or lap-type joints are the most reliable, simple and easiest to braze, and joints should be designed for shear wherever possible. From an electrical standpoint, lap joints offer joints whose electric resistance is no greater than the lightest member of the joint. On copper-to-copper joints brazed with B20A6 (Silfos), a lap 1½ times the thickness of the lightest member will give joints whose conductivity is equal to that of the solid unbroken conductor beyond the joint. The shear strength of a lap joint can be calculated, based on shear strength value of 25,000 lb. per sq. in. for silver-brazed joints.

Scarf joints in some cases may be necessary to avoid a lap joint, and offer some increase in strength and conductivity over a straight butt-type joint. A common instance where scarf-type joints are used is in making connections on rectangular copper bar to obtain a continuous-length copper rod for edgewise-wound coils. Where scarfed joints are used as a conductor, the general practice is to braze the joint with B20F2 alloy, since this alloy has higher conductivity than B20A6.

Butt joints are necessary at times, and when so, the surfaces should be milled or machined square and even. The use of jigs to maintain tight fits is also desirable.

It is always desirable to maintain close relationship between cross-sectional area of two brazed members.

Fig. 1 is based on tests using alloy B20F5. The tensile strength of the brazing alloy in wire form is about 56,000 lb. per sq. in., and that of the 18-8 stainless steel used was about 160,000 lb. per sq. in.

Brazing Procedures

Experience has shown that too much emphasis cannot be placed on the necessity of properly cleaned surfaces to be joined. These surfaces must be free from oil, grease, oxide scale, or other foreign materials. Such cleaning processes as acid dipping, steel-grit blasting (not sand blasting), or hand cleaning with emery cloth or paper are often used.

Silver brazing alloys, like solders, require a suitable flux, except when brazing copper to copper with B20A6 (Silfos). In this case, the phosphorus in the brazing alloy deoxidizes the copper surface, making for good wetting between the copper and Silfos brazing alloy. In all other cases, a flux is necessary. Brazing fluxes serve the same purposes as soft-soldering fluxes.

Just because a good flux will dissolve oxides does not excuse carelessness in cleaning prior to brazing. A clean joint to begin with will be far less troublesome than it would be to depend upon the flux to do the cleaning.

For torch brazing, the alloy may be melted into the joint from wire manipulated by the operator. When production warrants, preformed

Silver-brazing Alloys

G-E Designation	Composition, per cent: Silver	Copper	Zinc	Cadmium	Phosphorus	Lowest Melting Point, C	Brazing Temperature, C	Remarks
B20F2	50	34	16	..	..	690	775	General-purpose alloy. Wide melting range permits large fillets to be built up
B20F5	50	16	16	18	..	627	635	General-purpose alloy. Fine flowing qualities. (Trade name, "Easy-Flo")
B20A4	30	38	32	..	..	745	790	Low-cost alloy. Use on heavy work where overheating danger is not great
B20A6	15	80	..	..	5	640	700	Used on practically all copper-copper joints. Self-fluxing on copper. Suitable for brass, using flux. Never use on steel; embrittlement results. (Trade name, "Silfos")

ys and Procedures

By D. BASCH
General Electric Co., Schenectady

washers or rings of brazing wire are placed at the joint. This method must be used in furnace brazing. For resistance brazing especially, thin sheets of the alloy are frequently placed between the flat surfaces to be joined, thereby obtaining good distribution and economy of the brazing metal.

Methods of Heating

Often the method of heating is the factor governing the economies of the brazed joint, as well as the quality of the job. A specialist should be consulted on this point. However, a brief outline of the methods available will be given here.

A combination of fuels, such as oxyacetylene, oxyhydrogen, oxycity gas, or natural gas are most commonly used for gas brazing. When using a torch, the heat is applied to the parts away from the joint to bring both members up to the brazing temperature uniformly. A neutral or reducing flame is always used, except when brazing tough pitch copper; here an oxidizing flame is used to avoid embrittlement.

Metal bath brazing is a dip process wherein the filler metal is obtained from the molten metal bath. For a number of reasons, it is confined to joining comparatively small work, such as light gage wire.

The chemical bath method of heating requires that the assembled parts, with the brazing alloy in place, be carefully supported by jigs. It has the advantage of heating the members quickly and, at the same time, providing protection from the oxidizing effect of the atmosphere. Temperature is easily controlled in this process. The size of the chemical bath will depend upon the size and weights of the assemblies that are to be brazed, but in general these baths should be large enough so that there is no appreciable drop in the temperature of the bath when the assembled units are immersed.

The induction method of heating, as applied to brazing, is comparatively new. The advantage of this method is quick, localized heating. It is applicable to non-magnetic as well as magnetic materials.

Resistance Brazing

Resistance brazing is a process wherein the heat is obtained by passing an electric current through the parts being brazed. Carbon block brazing falls in this group, and is a very common method of heating in the General Electric Co. Briefly, the equipment consists of a transformer (5 to 10 or 20 kva.) and brazing tongs, either portable or stationary, to hold the carbon electrode.

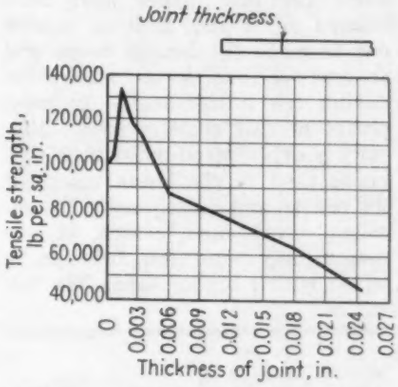


FIG. 1—Relation between joint thickness and tensile strength in silver brazing butt joints, stainless steel to stainless steel.

Resistance welding machines are sometimes adapted to brazing. In such cases, by means of thyratron control and tungsten electrodes, a high current at controlled timing is passed through, and the joint is brazed in a very short period of time. Resistance brazing has several advantages. In addition to applying heat under pressure, it heats rapidly. Heat is easily controlled, flame hazard is reduced, and the process can be readily adapted to untrained men.

The adaptation of furnace brazing to silver brazing alloys is comparatively new. It is being adapted to the brazing of high-production small assemblies and to large unit construction involving many joints, such as heat exchangers. Two brazing alloys cover most requirements B20A6 (Silfos) in copper-to-copper or copper-to-brass joints, and B20F5 (Easy-Flo) on copper-to-steel or brass-to-steel joints.

In the design of joints, a gap of about 0.003 in. is desirable when furnace-brazing with silver-brazing alloys. Silver-brazing alloys do not have the fluidity of copper in furnace brazing, and it is necessary to use a flux since hydrogen or other reducing gases will not reduce zinc oxide (zinc being present in all brass and most silver-brazing alloys).

Special Precautions

The 18 chromium—8 nickel type stainless steel can be brazed with very good success. Brazing alloy B20F5 is recommended in most cases due to its lower melting point. However, the brazing temperature required to silver braze is in the carbide-precipitation range for this type material, and where 18-8 is brazed, it is important to use a columbium-bearing 18-8 stainless steel. The addition of columbium to 18-8 tends to prevent the formation of carbide at the grain boundaries, and this reduces the danger of intergranular corrosion.

When silver brazing copper with a gas torch, or when furnace brazing in a reducing atmosphere, oxygen-free copper must be used to avoid copper embrittlement. If it is necessary to braze tough-pitch copper, extreme care must be used to avoid a reducing gas flame, which would embrittle the copper. Plenty of flux and an oxidizing flame must be employed.

Acid Open Hearth F

THE HEARTH: Although acid furnaces are generally smaller than basic furnaces, the thickness of brickwork in the sub-hearth is at least as great. In 80-ton furnaces now in use there are usually two courses of medium alumina fireclay brick next to the pan, and three courses of first quality silica brick above, making a total thickness of 15 in. of brickwork. There are considerable differences in the way in which the expansion allowances are made. In some plants, gaps as wide as 1 in. are left in the center of the furnace, while at other plants the expansion allowances are made under the banks. This latter arrangement would appear preferable since there is then less chance of the expansion joint becoming blocked by debris from above. That some expansion allowance is necessary was amply proved in a recent trial in which the joints became blocked and the whole of the silica brick structure of the hearth lifted when the furnace was heated up.

The monolithic section of the hearth is always installed by burning sand onto the brick, layer by layer. No one has been known to have yet attempted a completely rammed acid bottom. Thus, in one plant the furnace is heated up for four or five days before any attempt is made to sinter sand onto the brickwork. The temperature obtained is so high that each layer can be sweated to a mirror-like surface. If this is not done there is a risk that parts of the hearth will subsequently float up into the bath. A further four or five days are taken to burn in the hearth and when the last layers have been burned on, a slag melt is carried out to make the hearth dense and prevent serious metal absorption during the initial heats. In most plants in this country great difficulty is experienced in fritting high grade sand in the lower layers of the hearth and consequently the so-called silver sand, which at one time usually came from Belgium, is mixed with a brown sand. The following analysis given by Ferguson shows how impure this brown sand may be:

SiO_2	Fe_2O_3	Al_2O_3	CaO	MgO
79.6	2.70	11.10	1.90	1.0

In the lower layers of the hearth the ratio of brown to white sand may be as high as 1:4, but as the top layers are approached the proportion of brown sand is reduced until it is finally omitted altogether. According to the practical man, the effect obtained by using a mixture of brown and silver sand cannot be reproduced by employing a natural sand of intermediate purity.

Materials

The fireclay brick used in the hearth are similar to those employed at the bottom of basic hearths, while the silica brick, as already stated, are of the first quality. This is essential since, particularly in the banks, the monolithic material is only a few inches thick and a comparatively small amount of attack may result in the brick becoming the surface upon which the molten steel rests.

Although the properties of the sand used for bottoming and fettling are of considerable interest, they have not been the subject of much discussion in the literature. Table VI summarizes the properties of a number of sands successfully used in the United Steel works.

It may be observed from Table VI that all these sands have a silica content of over 98 per cent and, with one exception, an alumina content of less than 0.5 per cent. It is believed that this latter provision is essential, since the ability of silica to tolerate the presence of considerable amounts of iron oxide or lime without any great drop in refractoriness is seriously affected by the presence of even small amounts of alumina or alkalies. The iron oxide content of these sands is low, having frequently been reduced

TABLE VI

Properties of Acid Open Hearth Furnace Sands

Sand	Sand Analysis, Per Cent							
	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Alkalies, as K_2O	Ignition Loss
Belgian sand 1	99.47	0.25	0.03	0.02	tr.	tr.	nil	0.22
British sand 1	99.07	0.47	0.11	0.03	tr.	tr.	nil	0.32
British sand 2	99.20	0.34	0.11	0.05	tr.	tr.	nil	0.30
British sand 3	98.38	0.84	0.10	0.03	tr.	tr.	0.47	0.18
British sand 4	99.67	0.08	0.06	tr.	tr.	tr.	0.14	0.14

Sand Remaining on Sieves After Grading, Per Cent

Sand	B. S. Sieves, Mesh No.										Microscopic Examination	Angle of Rest, Cone Method, Deg.
	5	10	16	22	30	44	60	72	100	through 100		
Belgian sand 1					0.5	8.7	82.3	3.0	5.0	0.5	very rounded	30
British sand 1		0.5	1.0	6.0	19.0	41.4	21.1	5.0	4.0	2.0	moderately rounded	32
British sand 2			0.5	0.5	5.0	13.2	39.8	15.0	18.0	8.0	sub-angular	31
British sand 3					4.5	37.1	36.4	9.5	10.0	2.5	sub-angular	31
British sand 4			1.0	8.0	41.0	34.0	13.5	1.0	1.0	0.5	very rounded	30

h Refractories

By J. H. CHESTERS
Central Research Department, United United Steel Companies, Ltd., England

. . . The refractories used in the hearth, gas and air uptakes, checkers, and doors of the acid open hearth are described in this second section of a two-part article, along with their construction and suggested lines of improvement.

by careful washing prior to delivery.

The sands normally employed for fettling acid open hearth furnaces have such a limited grain size range that a large number of sieves are required to cover the significant fractions of the grading. The typical range is shown in Table VI, together with the equivalent sieve apertures. It will be seen that 82 per cent of the Belgian sand passes through a 44 mesh sieve and remains on a 72 mesh sieve. The limited range of particle size of this material as compared with that of a typical British sand and the specification for one German sand are brought out in Fig. 4. It will be seen that the British sand covers a wider range than the Belgian, while the German material would be better described as a crushed sandstone since it contains 23 per cent of over 0.2559 in. (6.5 mm.) material.

According to Abkehr, even coarser saids are employed in Germany, but the use of material of over 0.394 in. (cm.) in diameter is not recommended since it is stated that it may "spall" upon heating with such violence as to cause injury to the operators. Ferguson suggests that the white sand "must consist of clear colored, uniformly sized, rounded crystals. It should not contain angular, irregularly shaped masses and fines which will not build into uniform layers on the furnace banks." This is an ac-

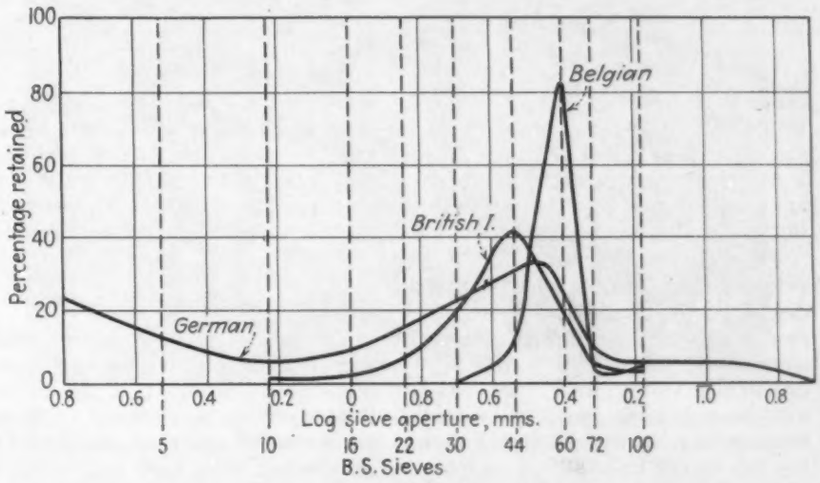


FIG. 4—Grading characteristics of British, Belgian and German open hearth furnace sands.

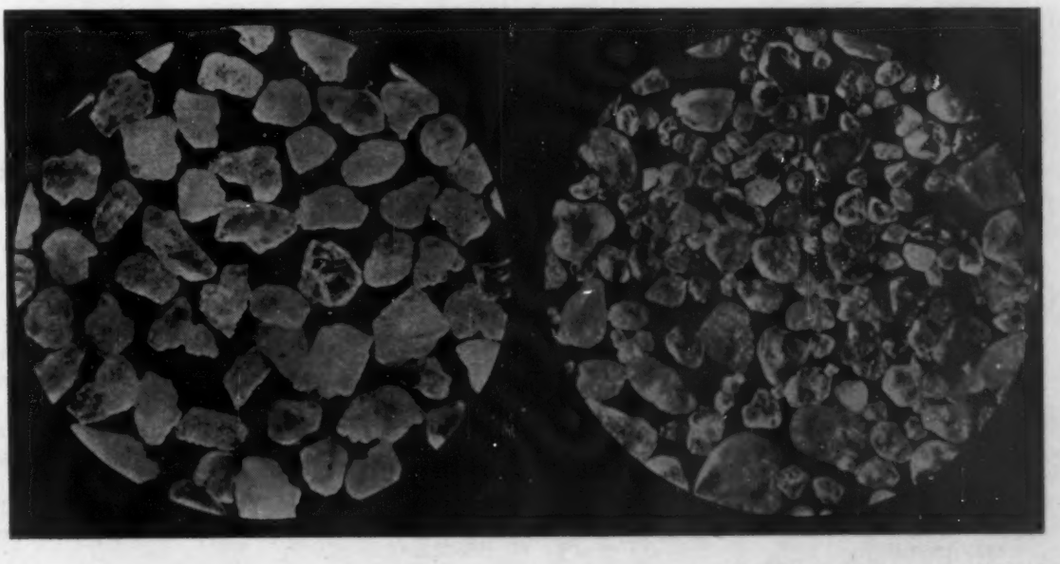


FIG. 5 — Silica sands showing, left, uniform grain size and sub-angular shape, and right, non-uniform size and rounded grains. Magnification is 25 diameters.

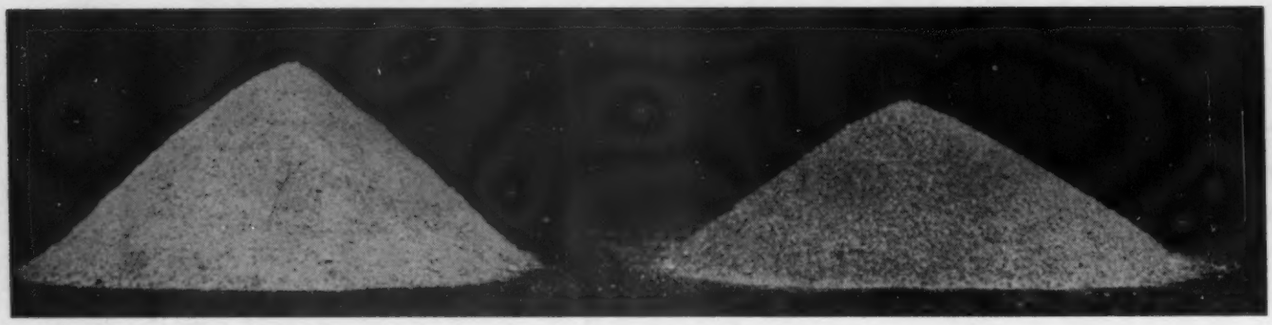


FIG. 6—The influence of grading on the angle of rest is demonstrated by these illustrations. The 70:30 sand-silica flour cone on the left is much sharper than the plain sand cone on the right.

curate description of the Belgian material which has hitherto been considered a standard of excellence, but, as will be shown in a later section, it does not necessarily represent the ideal acid furnace hearth material.

Examination of sands under the microscope provides useful information regarding the shape, nature, and distribution of the impurities. Characteristic photographs given by Walker in his book on foundry sands are shown in Fig. 5. There would not, however, appear to be any definite evidence as to whether a rounded grain is superior to an angular one, either for bottom making or for fettling.

First quality Belgian sand has a refractoriness of about 3182 deg. F. Such temperatures are not readily attained in ordinary ceramic equipment, but if a sillimanite crucible is filled with such sand and heated fairly rapidly to this temperature, it will be found that the top layers have gone to a clear glass. Other sands, such as No. 3 in Table VI, will yield a glass at 68 or 86 deg. F. lower temperature. Since there is a very small margin of safety between the tapping temperature of the steel and the refractoriness, even of clean sand; and since this refractoriness must be brought down considerably by the pick-up of impurities, the advantage of using the most refractory sands available should not require emphasis.

If sand is poured through a funnel onto a bench it assumes a cone shape and any attempt to build it up above a certain angle does not succeed provided the material is really dry, as shown in Fig. 6. The angle that the surface of the cone makes with horizontal, which is known as the angle of rest or repose, is comparatively small (being from 30 to 33 deg.), but as will be seen later, can be made to vary considerably by artificial means such as the addition of a finer ground fraction.

Life and Causes of Failure

The life of an acid hearth, like that of the basic, is largely a matter of convention. If a hearth is treated with respect, metal splashed out whenever observed, and fettling maintained at a high standard, it can be made to last for eight years or more. However, as with the basic hearth, it is now considered better practice to renew hearths at more frequent intervals rather than to go on working with hearths requiring an excessive amount of fettling and a great deal of "bad bottom time." Thus, it was suggested at the 1941 meeting of the American Open Hearth Conference, that a life of 1000 heats could be considered satisfactory.

Periodically hearths are "flowed" by carrying a very high temperature and by throwing on lime, the slag which forms being drained off through the tap hole. When all the available metal pockets in the hearth have been removed, it is built up again by burning on sand until the original contour has been obtained.

Comparatively little work has been done on the changes that a hearth undergoes during its life, though one classical piece of work is available: that of Whiteley and Hallimond. These authors have shown that after a certain period the silica hearth takes up a good deal of iron oxide and the working face becomes converted to cristobalite. A typical set of hearth analyses have been given by Ferguson and are shown here in Table VII.

It will be seen that the analysis of an eight-year-old hearth is very much the same as one that had only been in operation for 12 weeks. Both hearths contain over 20 per cent of iron oxide, the ratio of FeO to Fe_2O_3 being considerably greater than for magnetite. The alumina content of the hearth in spite of the undoubted pick-up from dirty scrap is only about 2 per cent, while the manganous oxide content is about 4 per cent and the lime, 1 to 2 per cent. In spite of the remarkable ability of silica to remain rigid even when associated with considerable amounts of iron and manganese oxides, a property which will be discussed in more detail in a later section dealing with raw materials, such slagged materials cannot have a refractoriness very much higher than is essential if they are not to soften in contact with molten steel.

Ferguson expresses the opinion

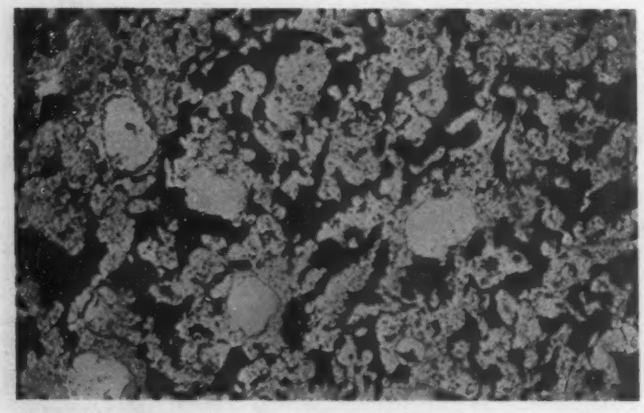


FIG. 7—An acid open hearth roof brick gray zone is illustrated here showing magnetite in cristobalite network. Enlarged 40 diameters with ordinary light.

that the oxide of iron network which cements together the silica crystals (or more correctly perhaps the oxide of iron which fills the interstices in the silica network) gradually corrodes, and ultimately fluxes away these primary grains, thus requiring a constant renewal of the working face. In other words, the iron oxide which helps to bind together the hearth ultimately causes its destruction. The fettling carried out after each cast, however, reduces the concentration of fluxes in the working face.

As with the basic hearth, considerable damage is undoubtedly done by metal left on the hearth after tapping. This material oxidizes and provides a local excess of iron oxide which must result in a softening of the silica hearth. To avoid this, all such metal pockets should be rabbled out as thoroughly as possible and dried up with silica sand. The gas is taken off when this operation is complete and the metal-sand debris is pulled out over the furnace sills. After heating up again, new fettling material is burnt on. The desirability of maintaining the proper slope to the taphole and thus insuring adequate drainage, cannot be over-emphasized.

Figs. 7 and 8 illustrate the similarity in structure of the working face of the roof and hearth. It will be seen that in both positions the silica has changed to cristobalite which has formed itself into a continuous network with magnetite and other impurities in the matrix. Lower down in the hearth and

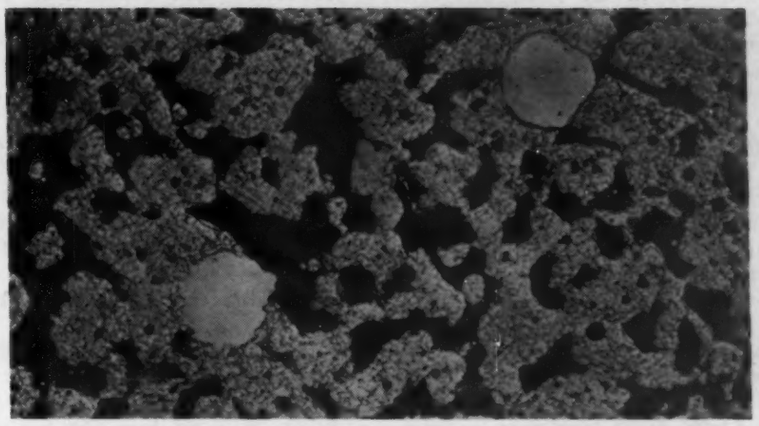


FIG. 8—The bottom of an acid open hearth furnace. The gray zone at the working face shows magnetite in a cristobalite network.

o o o

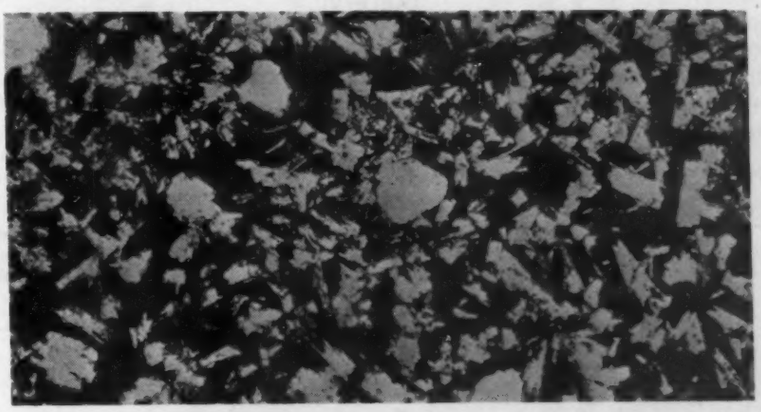


FIG. 9—An acid open hearth furnace bottom. The black zone behind the working face shows tridymite laths. Magnification, 40 diameters and ordinary light.

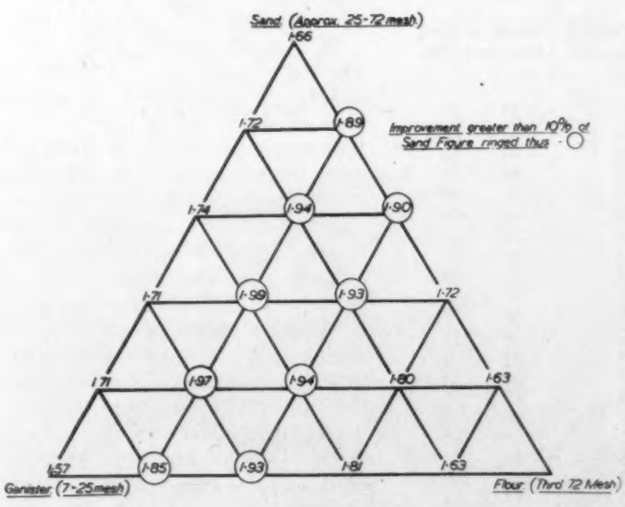
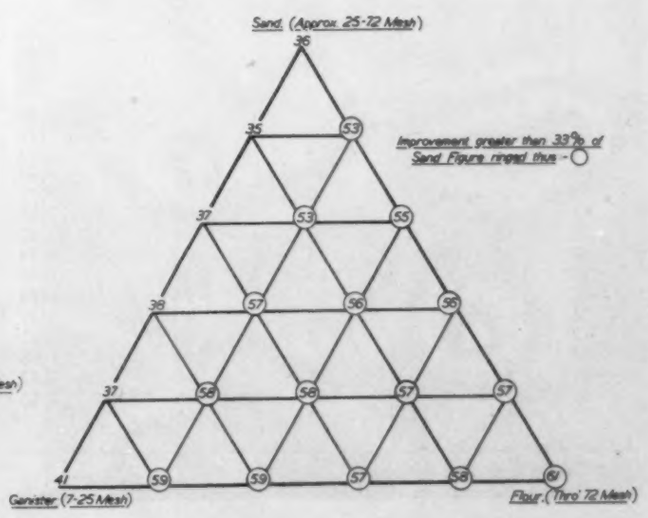


FIG. 10—Packing density of ganister-sand-silica flour mixtures.

FIG. 11—Ganister-sand-silica flour mixtures angle of rest data are shown here.



higher up in the roof, this cristobalite changes, as would be expected, from equilibrium considerations, to tridymite, shown in Fig. 9, while even lower in the hearth, as on the cool face of the roof, some quartz remains.

The amount of silica sand used in making a new hearth is only a small part of that used for fettling during a campaign. At one plant a fettling figure of 45 lb. per ton of steel produced was given while at another the consumption of sand was stated to reach about 120 lb. per ton of steel, that is, after an 80 ton cast from 2 to 4 tons of sand may have to be burned in position to replace that removed during the previous heat. It is clear that this represents not only a lot of sand but also a serious delay in steel production, and hence it is quite reasonable to suggest that if the complete renewal of a hearth results in a marked decrease in fettling time, it may well prove economical even though the life of the hearth is considerably shortened.

Lines of Improvement

If a pint jar be filled with marbles it can easily be demonstrated that there is still room in the jar for about half a pint of water, that is, that this particular packing of grains has an intergranular porosity of approximately 50 per cent. If the jar was filled with rounded sand grains of equal size the porosity would still be about 50 per cent. The sand used in making open hearth furnace bottoms is not quite uniform in size and packs somewhat due to softening and reaction with the slag, but the fact remains that hearths made in this way are likely to be porous compared with those that could be obtained by packing a suitably graded mass.

If it were not for the abnormal growth of sand as it changes from quartz to cristobalite the installation of dense silica hearths would be a comparatively easy matter, but even allowing for this difficulty it would appear likely that better hearths could be obtained if finely ground siliceous material, namely, silica flour were incorporated in the sand used, so that the interstices between the sand grains were filled with material of similar refractoriness. Preliminary results both in the laboratory and the works suggest not only that such a procedure is practicable, but that it results in a definite improvement on existing practice.

The experimental basis for such a statement is shown in Figs. 10 and 11, which were obtained from

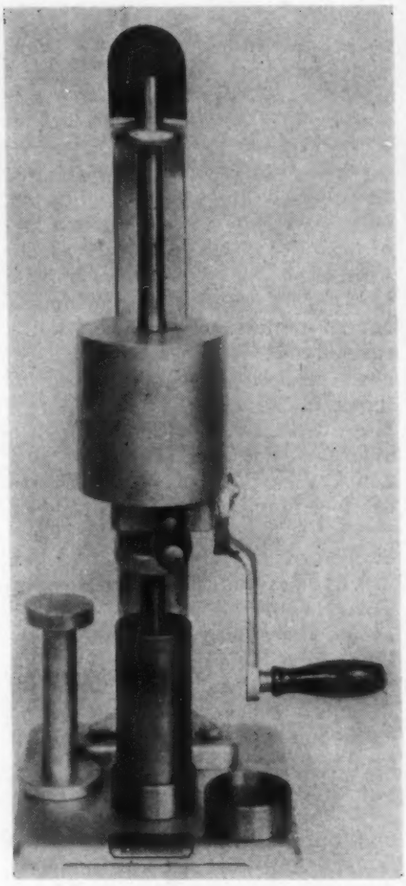


FIG. 12—The American Foundrymen's Association sand rammer used for packing density tests.

TABLE VII

Composition of the Working Hearth in a 60-ton Acid Furnace*

Hearth No.	Hearth Composition, Per Cent							Bottom in Service
	SiO_2	FeO	Fe_2O_3	Al_2O_3	MnO	CaO	MgO	
1	70.54	15.84	5.51	2.29	5.28	0.08	0.72	12 weeks
2	69.24	18.00	4.44	2.65	4.05	1.04	0.86	13 weeks
3	67.40	20.40	3.96	1.06	5.02	2.10	0.44	8 years
4	73.60	17.50	3.44	2.06	2.27	0.84	0.21	— — —

* Ferguson.

TABLE VIII

Packing Density and Angle of Rest of Ganister, Sand, and Flour Mixtures

Batch Number	Mixture, Per Cent			Packing Density, Gm. per Cu. Cm.	Angle of Rest, Deg. and Min.
	Ganister 7 to 25 Mesh	Sand 25 to 72 Mesh	Flour Through 72 Mesh		
1	80	20	0	1.71	36 41
2	0	20	80	1.63	57 28
3	40	20	40	1.94	57 48
4	20	0	80	1.85	58 54
5	0	80	20	1.89	52 59
6	40	40	20	1.99	56 57
7	20	80	0	1.72	35 11
8	20	0	80	1.63	58 27
9	20	40	40	1.93	55 44
10	60	40	0	1.71	37 46
11	60	0	40	1.93	58 45
12	60	20	20	1.97	57 48
13	40	60	0	1.74	37 0
14	0	60	40	1.90	54 59
15	20	60	20	1.94	53 12
16	0	40	60	1.72	56 7
17	40	0	60	1.81	57 28
18	20	20	60	1.80	56 48
A	100	0	0	1.57	40 30
B	0	100	0	1.66	35 54
C	0	0	100	.... *	60 32

* Flowed around the plunger.

If it were not for the abnormal growth of sand as it changes from quartz to cristobalite the installation of dense silica hearths would be a comparatively easy matter, but even allowing for this difficulty it would appear likely that better hearths could be obtained if finely ground siliceous material, namely, silica flour were incorporated in the sand used, so that the interstices between the sand grains were filled with material of similar refractoriness. Preliminary results both in the laboratory and the works suggest not only that such a procedure is practicable, but that it results in a definite improvement on existing practice.

The experimental basis for such a statement is shown in Figs. 10 and 11, which were obtained from

a series of laboratory tests. The packing density figures were obtained by ramming given weights of different gradings in an American Foundrymen's Association type rammer, illustrated in Fig. 12. The detailed results obtained are set out in Table VIII. In the present experiments 0.0541 lb. of material were used in the A.F.A. rammer and 50 blows employed to compact the material before determining its packing density.

The angle of rest figures were not obtained by the ordinary cone method, but by piling up the mixtures on a shelf 15 x 7 in. to the maximum height obtainable. The angle of rest obtained in this way is 2 or 3 deg. higher than that given by cones, possibly due to the end effect on the shelf, but the results are strictly comparable within themselves and are more readily reproduced than by the cone method.

Both in the packing density and angle of rest tests, a proportion of ganister of 7 to 25 mesh was incorporated in certain of the mixtures so that wider grain size ranges such as are employed in Germany could be considered. It will be seen that the addition of silica flour results in a marked increase both in the packing density and in the angle of rest and that for most purposes a 20 per cent addition is sufficient. It is not suggested that such materials provide ideal fettling material since it is clear that segregation will occur during throwing, and if the material is dry there will be considerable risk of silicosis. However, it is suggested that the production of denser hearths, possibly rammed rather than burned in, could be achieved along such lines. That such mixtures sinter much more readily than straight silica sand is clearly demonstrated by the condition of the A.F.A. test pieces shown in Fig. 13, which were fired for 1 hr. at 2912 deg. F.

o o o

FIG. 13—Sinter tests on silica test pieces. After 1 hr. at 2912 deg. F. The ganister-sand-silica flour test piece at left held its shape as did the sand-silica flour sample in the center. The straight sand test piece at right crumbled, as to be expected.

Gas and Air Uptakes

Larsen and Schroeder made a study of silica brick removed from acid furnace downtakes and have shown that the mechanism of breakdown is essentially similar to that observed in the acid roof, although the concentration of iron oxide in the working face, about 20 per cent, is considerably greater. The downtake brick differ from the roof brick in that the first zone is generally black. This is rather surprising since the temperature would appear to be well above that at which cristobalite should be the stable form, that is, 2678 deg. F. Both this and the similar phenomena observed with the arc furnace roof require further study but it is possible that in both cases the absence of cristobalite is associated with a lower *average* temperature and also to the more rapid corrosion of the working face due to reducing conditions.

Both the gas and air slag pockets and the Launder are similar to those employed in the basic process and hence will not be described again.

The Checkers

The main difference between acid and basic checkers is that in the latter the silica or high alumina brick in the top courses become rapidly corroded, while in the former the cause of failure is choking rather than slagging away. Thus, the acid checker shown in Fig. 14 had only been in operation for 7½ weeks.

Numerous analyses have been published of the dust which forms in the checkers of acid furnaces, but all these data may be summarized by saying that the main constituent is iron oxide and that other impurities, such as ore, found in considerable proportion in basic checkers, namely, lime and zinc oxide, are generally present in very much smaller amounts. The material that adheres to the top of the

o o o

FIG. 14—After only 7½ weeks operation the checkers of the acid open hearth furnace shown here are completely choked.

o o o

brick is in the nature of a hard sponge, while that at the bottom is comparatively loose dust. The brick underneath are almost unchanged but a great deal of time is wasted if the furnace has to be taken off so that the checkers can be adequately cleaned.

Frequently a long shut down can be avoided by blowing out as much as possible of the dust with compressed air or steam jets. It has been suggested that the choking is due to iron vapor that escapes during the boil, being converted into FeO fume and later into Fe_2O_3 below 2282 deg. F. during reversals and in cooling at weekends. The change to ferric oxide would be accompanied by a large change in volume and would account for the sponge like structure. One sample of such dust analyzed by Ferguson showed an Fe_2O_3 content of 97.3 per cent.

Since this dust is presumably an inevitable result of the process, it would appear that the problem will continue unless some type of efficient refractory dust catcher can be devised. Undoubtedly the gas and air slag pockets serve this purpose to some degree. They trap the slag that forms by the reaction between iron oxide and silica in the ports and downtakes. The amount of untrapped dust is, however, still far too great for efficient operation of the checkers.

The construction of the checker chambers and also of the gas and air valves and flues are essentially similar to those of the basic furnace.

Doors

The characteristic difference between the behavior of doors on acid and basic furnaces is similar to that found in every other part of these furnaces, that is, the main corrodant is iron oxide instead of a mixture of iron oxide and lime. Thus, bricks removed from trials of high and medium alumina fireclay brick in acid furnace doors had the following analyses:

Sample Brick	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	TiO_2	MnO
High alumina brick	57.98	35.10	5.28	0.10	0.40	0.29	0.13
Medium alumina brick	61.08	31.88	3.80	0.22	0.76	1.33	0.13

It will be seen that the only appreciable pick-up is 3 to 5 per cent of iron oxide. It is of interest to note that in these trials some 33 per cent additional life was obtained with the high alumina quality in spite of its higher porosity, suggesting that the use of such bricks in acid furnace doors would be economical provided the price difference was not too great.

Acknowledgment

In conclusion I should like to thank Dr. T. Swinden, director of research, the United Steel Companies, Ltd., for permission to publish this article, Messrs. Ridsdale & Co. for the photograph of the sand rammer, T. R. Walker for Fig. 5, Percival Smith for the photographs of acid furnaces and colleagues in the steel and refractories industries for their constant assistance.

Bibliography

(Exclusive of references included under the sections dealing with materials or already given under basic open hearth furnaces)

GENERAL:

Larsen, B. M., Schroeder, F. W., Bauer, E. N., and Campbell, J. W., Carnegie Institute of Technology Mining and Metallurgical Investigations, Bulletin No. 23, 1925.

Manual of the American Society for Testing Materials on Refractory Materials.

Sosman, R. B., *Journal of the American Ceramic Society*, 1938, 21, 37.

Swinden, T., and Chesters, J. H., Iron & Steel Institute (London), Special Report No. 22, p. 275.

HEARTHS:

Abkehr, H., *Stahl und Eisen*, 1936, 56, 818.

American Foundrymen's Association, Testing and Grading of Foundry Sands and Clays, Chicago, 1938.

Ferguson, J. M., Iron & Steel Institute (London), Special Report No. 22, p. 41.

Walker, T. R., Foundry Sands, Charles Griffin & Co., Ltd., London, 1938.

Whiteley, J. H., and Hallimond, A. F., *Journal of the Iron & Steel Institute* (London), 1919, 99, I, 199.

SILICA CEMENT:

Clews, F. H., Booth, H., Richardson, H. M., and Green, A. T., British Reference Research Association Bulletin, 1934, 35, 1; 1936, 41, 33; 1937, 44, 54; and 1938, 48, 32.

Cole, S. S., *Journal of the American Ceramic Society*, 1935, 18, 61.

Dodd, A. E., and Green, A. T., Iron & Steel Institute (London), Special Report No. 26, 1939, p. 21.

Pitt, N. P., and Gallay, W., United States Patent No. 2,210,327.

Composite Castings by Consecutive Pouring of Two Metal Melts

A BRIEF account of composite casting experiments carried out in the U. S. S. R., appeared in the June 13, 1941 issue of Giesserei by P. J. Ljamin. A small revolving mold 3.7401 in. in diameter x 3.426 in. deep was used at a peripheral speed of 26¼ ft. per sec. and the following combinations of metals were cast in it: (1) Steel with an inner layer of bronze; (2) bronze followed by steel; (3) cast iron and bronze; (4) bronze and cast iron; and (5) 86 per cent pure aluminum with an inner layer of an aluminum-base bearing metal.

In each case tests were made at different time intervals between the pouring of the first and second metals to ascertain the conditions that gave the best adhesion between the metals. The combinations, the optimum time intervals were 20, 30 to 40, 15 to 25, 20, and 15 to 25 sec., respectively. Quantities of the cast were not shown.

Desulphurization with Acid Iron Slags

AN investigation of the possibilities of desulphurizing molten iron with acid slags was made by R. Durrer, H. Hellbrugge, and B. Marincek, and reported in the May, 1941, issue of *Archiv fur das Eisenhuttenwesen*. Examinations of how the process was affected by the slag composition and temperature, and the nature of the silicon-sulphur compound which is formed were included.

The laboratory experiments proved that molten pig iron could be almost fully desulphurized provided the temperature was kept at least at 3092 deg. F., and provided the sulphur left the melt in the form of gaseous silicon-monosulphide and did not pass into the slag which remained low in sulphur. It was the silica in the slag, rather than the silicon in the iron, which acted as the sulphur carrier in the gas phase.

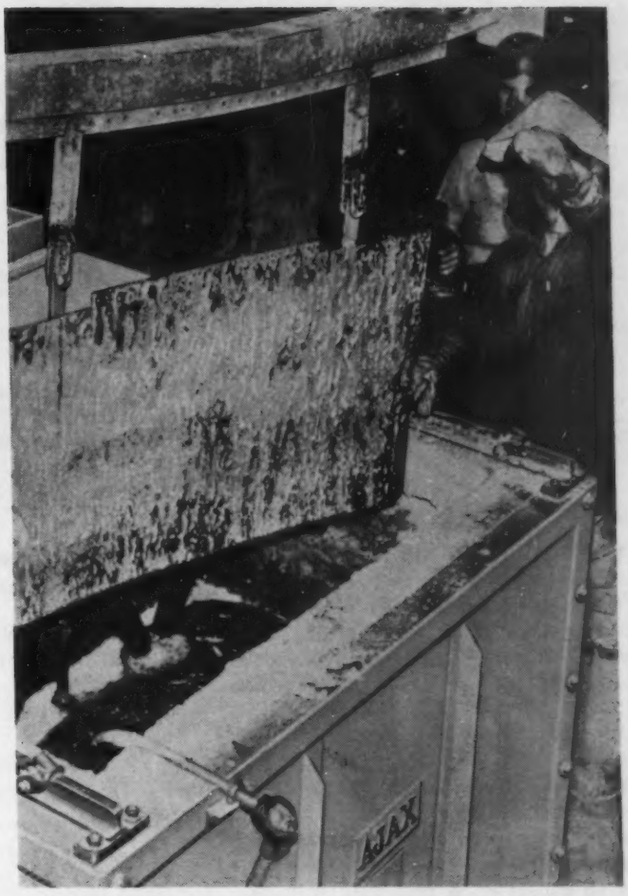
New Equipment Speeds The War Drive

A CHANGE-OVER from machining to quick forging of cap screws was effected at the Allen Mfg. Co., by installation of this Tocco induction heating machine. The entire screw making operation has been reduced from 90 to 21 sec., and 1/2 in. smaller bar stock is used.

o o o

BELOW

NEW laboratory of the Vanadium Corp. of America, designed and built by Rust Engineering Co. A ventilating system controls atmospheric dust and gases —to which alloy analysis is extremely sensitive—by maintaining a perpetual positive pressure within the laboratory.



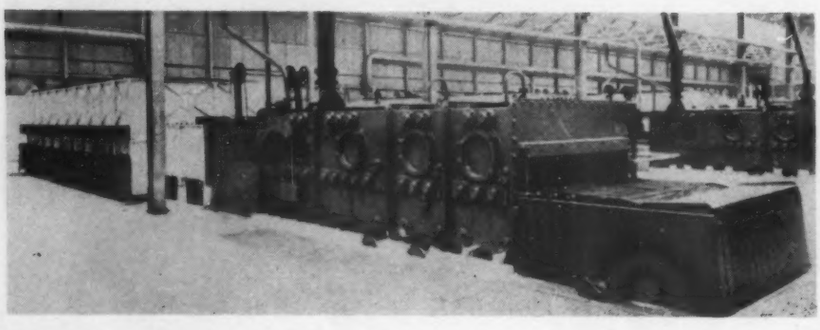
FORMER limitations of 0.050 in. in case depth have been removed by a new deep-case carburizing procedure developed by Ajax Electric Co., Inc., Philadelphia. Utilizing a new salt bath furnace design, case depths up to 1/8 in. are produced, and the new furnaces permit quenching directly from the bath, or transfer to baths maintained at quenching temperatures, thus eliminating a reheat for hardening. Furnace pots, capable of being maintained at plus to minus 5 deg., of the 1750 deg. F. operating temperature, range from 10 in. in diameter to 20 ft. in length for carburizing large plate sections and shafts.

New Equipment . . .

Finishing Apparatus

Further developments in shell and cartridge case finishing machinery, along with a number of new coatings developed to meet the war-born ocean transport problem are outlined in this week's news.

VIRTUALLY all British shell case plants are using a new process which eliminates the frequent handling of pieces in annealing and pickling operations. Developed by Curran Brothers, Cardiff, Wales, it is marketed in this country by *Hanson-Van Winkle-Munning Co.*, Matawan, N. J. A typical installation includes a series of pickling chambers placed at the discharge end of a gas-fired muffle type annealing furnace. It is so constructed that cold worked articles—shell cases and similar pieces—can be loaded on a conveyor at the charging end of the furnace and need not be touched until they emerge at the other end of the combination machine, annealed, pickled, washed, and warmed for quick drying. The pickling chambers employ multiple high pressure sprays, first of acid and then of hot water. It is pointed out that the process eliminates the multiple handling of cases now common in American plants, and that its enclosed construction permits it to be installed in the press room, thereby saving time and handling costs. The use of controlled atmosphere furnaces may be reduced by installation of the new equipment, which is designed for brass and for steel cases ranging from the 37 mm. size upwards. Further advantages claimed are a reduction in the quantity of acid used; as well as a time saving, indicated by reports that the complete operation generally requires 100 minutes from start to finish.



Solvent Emulsion Cleaner

THE COWLES DETERGENT CO., Cleveland, has developed LIXOL, a solvent emulsion type cleaner. Suitable for use on all metals, it leaves an invisible oil film, producing a physically clean surface. LIXOL can be used alone or diluted either with water or kerosene.

Metal Cleaning Solution

RUSCAT is the name of a new metal cleaning and rust proofing solution just developed by the *United States Stoneware Co.*, Akron. Its principal use is to clean metals prior to application of corrosion resistant paints and coatings, as well as to prevent further rusting. Applied by brushing or dipping, it produces a mild etch which develops a chemically adherent inorganic base over which lacquers and coatings gain maximum adhesion.

Copper Blackening Process

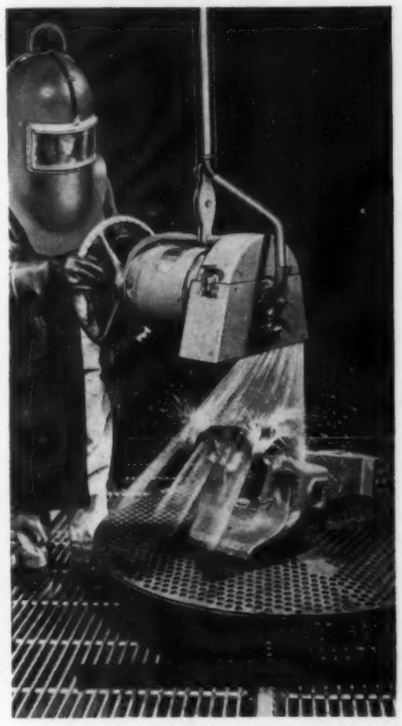
A SIMPLE, low temperature blackening process for copper and its alloys has recently been developed by the *Enthone Co.*, 442 Elm Street, New Haven, Conn. EBENOL "C" is a process involving immersion for 2 to 10 min. in a solution of blackening salts operated at 200 to 212 deg. F. The coating formed, essentially cupric oxide, is integral with the base metal and is hard enough to be buffed and need not be lacquered to prevent wear. Coated parts will stand considerable abuse, including heating to 700 deg. F. without flaking. Electric current is not required for the blackening process.

Anti-Rust Oil

A NEW anti-rust oil, known as MICCROIL, has just been introduced by the *Michigan Chrome & Chemical Co.*, 6340 East Jefferson Avenue, Detroit. Among its qualities are a high flash point, which reduces fire hazard, and a drying time of 30 to 45 min. It is applied by hand dipping and has a consistency said to assure uniform coating. Once applied, protection is constant until it is wiped off or removed with a solvent. The company reports that tests have shown it to be valuable in protecting aircraft parts, gages and tools, as well as in plating plants where corrosive atmosphere are present.

Portable Blast Cleaner

A PORTABLE WHEELABRATOR for the blast room is a new development of the *American Foundry Equipment Co.*, Mishawaka, Ind. Being airless, it eliminates compressors, pressure tanks, mixing chambers and allied equipment, and it is said that the device has been successfully applied to the cleaning of a wide range of intri-



cate work, particularly in shops where the variety of the work does not justify special equipment. The manufacturer claims complete flexibility for the unit, in any direction and to any part of the blast room.

Naphtha Substitute

A SAFETY substitute for naphtha, gasoline and kerosene is now being marketed by the *Curran Corp.*, Malden, Mass., under the name GUNK. The new solvent is claimed to have a wide industrial use as a superior naphtha substitute in grease cleaning and hand wiping operations in ordnance factories and shell plants. GUNK, according to its makers, does not de-oil the skin, has no toxic vapors, and no flash or fire point. It leaves an invisible rust preventive film so thin it can not readily be detected.

Metal Coating

PAINT over DEOX-X, a new product of *Protective Coatings, Inc.*, Detroit, will last five times longer than it will last on untreated metals, the company announces. Used cold, or heated for more rapid removal of oil, it is applied by brushing, spraying or sopping with a damp cloth. It is a corrosion inhibitor which removes corrosion and oil on application, and prepares the metal for a finish coat. DEOX-X can be used on galvanized sheets and is a potential substitute for tin plating.

Anti-Corrosive Film

P-F FIXATIVE is the name given to a new product of *Paint Formulators Co.*, 221 North LaSalle Street, Chicago. Formulated to prevent rust and corrosion of metals exposed to sea atmosphere, it is also resistant to acid and alkali fumes and acts as an electrical insulator. According to the manufacturer, it can be brushed or sprayed on in any kind of weather, and makes an excellent base coating for painting.

Automatic Wash Tank

A LINE of wash tanks to meet specialized requirements is now offered by *Bell & Gossett Co.*, Chicago. The unit illustrated, a three-compartment machine for cleaning castings, is fully automatic in operation and temperature control. Castings are successively passed through cold kerosene, hot Oakite, and finally, hot water. The two hot baths are maintained at proper temperature by water heated in a steam converter and mechanically circulated through coils in the tanks.

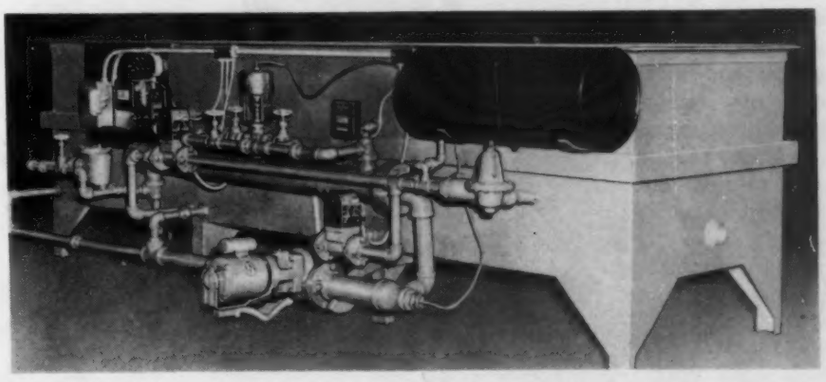
Black Iron Rust Inhibitor

THE WATSON-STANDARD CO., Pittsburgh, announces development of a new organic coating for black iron which it claims can be applied very economically at the steel mill and which will result in the solution of many coating problems. An oxidizing type coating intended to replace oil, it is corrosion resistant and serves as a prime coat for all types of synthetic and oleo-resinous coatings. Its use as a substitute for tin plating has been suggested.

Mixer Bracket

THE addition of two V-shaped brackets to hold its direct drive air motored agitators has been announced by *Eclipse Air Brush Co.*, 400 Park Avenue, New-

ark. The brackets are made for 30 and 50 gal. drums, and are fitted with a screw clamp to allow for size variations in the drums and to insure steadiness of the agitator. The mixer can be adjusted to any angle.



Transparent Finish

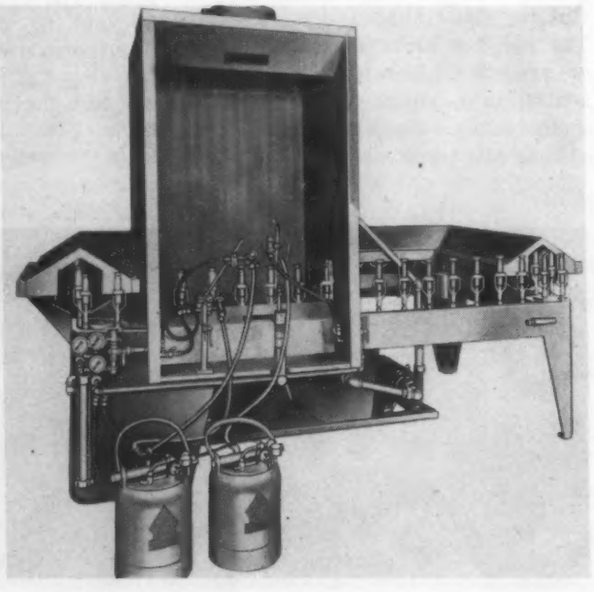
A COLORED transparent finish for use on polished metal is being produced by *Maas & Waldstein Co.*, Newark. PLATE-LUSTRE, the new coating, consists of a concentrated enamel added to a clear lacquer. It uses no critical materials, and when applied on polished metals, makes them resemble copper, brass, aluminum and similar metals.

Liquid Plastic Coating

ADOLPHE HURST & CO., 330 West 42nd Street, New York, are now offering what is said to be an entirely new type of acid and alkali proof coating. It is applied like paint, in two coats, in a solvent which evaporates to leave a tough dielectric membrane which adheres firmly to steel, wood, concrete and other surfaces. Known as LIN-TITE, it is claimed to have a wide application in protecting metal plating and acid storage tanks, as well as in exhaust systems and tank cars.

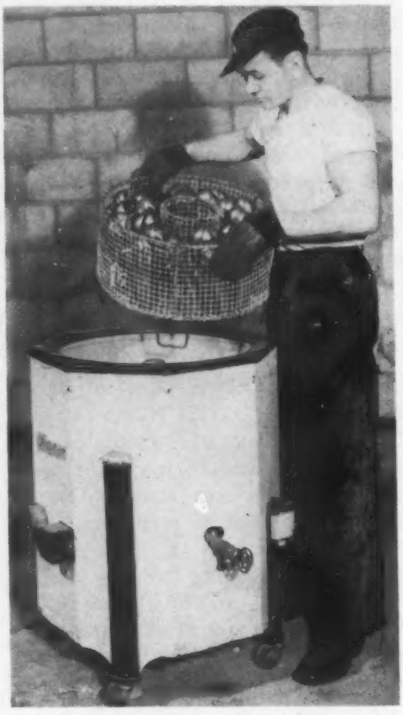
Shell Painting Unit

INTERIOR and exterior coating is applied to 40 mm. shells at the rate of 1920 pieces an hour by a new airpainting machine introduced by *Paasche Airbrush Co.*, 1909 Diversey Parkway, Chicago. This speed, which is based on a 2¼ min. drying time, can be increased or reduced by means of a variable speed drive. Revolving spindles mounted on steel roller chain carry the shells, first to interior, then to exterior painting units, and finally through an infrared drying section. Holding fixtures are interchangeable for different size shells, and spindles are removable. Both spraying operations are carried out in a water wash exhaust booth, said to eliminate manual cleaning and save time and maintenance.



Ingenious Cleaning Machine

INSTALLATION of a *General Electric* CALROD heater in a second hand washing machine is speeding output of a small metal specialty at the Koch Mfg. Co., St.



Louis. A soap solution used as a cleaner was formerly brought to 190 deg. F. in a gas heated tank, but the procedure was considered too slow. A 5000 watt CALROD heater, looped around the bottom of the washing machine, now brings the soap solution to the proper temperature eight to ten times faster than the former method.

Metal Lead Primer

THE metallic non-rusting components of HYSPAR metal lead primer make it a coating equal in protective qualities to aluminum paint, according to its producer, the *Midland Paint & Varnish Co.*, Cleveland. It may be brushed, sprayed or dipped, and dries hard in 4 to 5 hr. A rust inhibitor, it is neutral gray in color and will not bleed through the finishing coat.

Paint Can Adapter

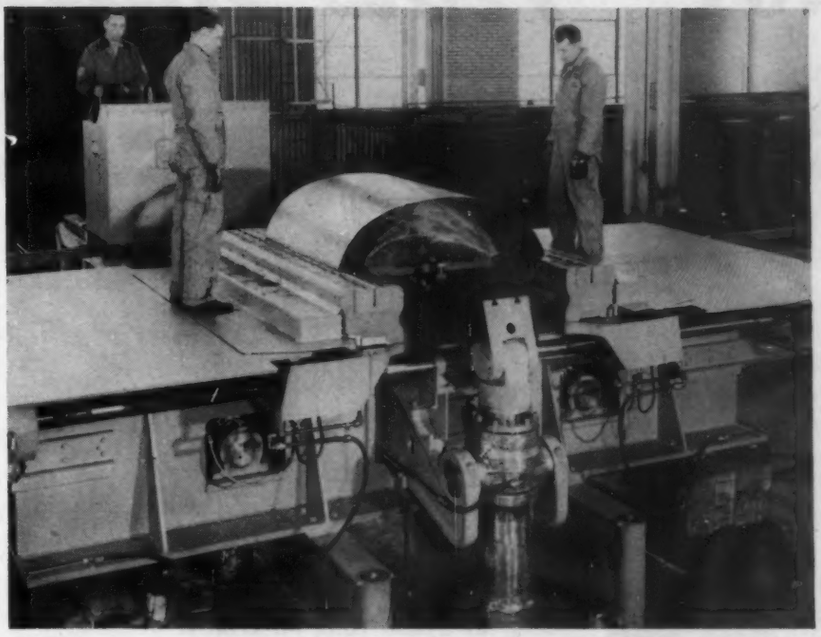
SO that the original paint can may be used as a reservoir on a spray gun, the *Binks Mfg. Co.*, Chicago, has developed a simple

and inexpensive adapter. The shortage of aluminum for paint cups, and the possibility of using a separate can for each color make the device extremely practical, the company states.

pH Testing Set

TESTS of pH in pickling and plating solutions can now be made by a simple technique employing a set of buffer tablets in combination with HYDRION wide-range test paper. The outfit is manufactured by *R. P. Cargille*, 118 Liberty Street, New York. Solutions of known pH, made by dissolving the tablets in the set, are applied to the test paper to bring out on the paper a reference color for any half unit from pH 3 to pH 11. This color comparison permits determination of the pH of the sample with greater accuracy than it is possible to attain with color charts.

Novel Metal Stretching Press



MOVEMENTS in two directions are provided on a new form of metal stretching press, the first one of which has just been built by the Hydraulic Press Mfg. Co., Mount Gilead, Ohio. Aside from the vertical movement of the main platen which pushes the die upward into the stretched sheet, provision is also made to allow the clamp jaws to move in toward the main platen in response to tension in the sheet under controlled hydraulic retardation. Another feature is the ability to swing the platen around 90 deg. from the position shown. It can then be elevated through two auxiliary hydraulic cylinders located within the press frame In this position, the stretching machine has been used to form the keel of a pontoon for a large flying boat.

On some of the experimental runs made with this machine, sheet steel has been stretched with wood dies and sheet duralumin on Kirksite zinc alloy dies. Using wood dies furnished by the Flexible Co., Loudenville, Ohio, H-P-M was able to successfully form the corner section of a bus body out of 20-gage automotive deep drawing stock. The tonnage required for this die, which was approximately 48 by 48 in., was only 65 tons. The Flexible Co. indicated that it had never been able to get a complete stretch on this particular die before —even with a special analysis steel. With the Kirksite dies 2450 dural sheets, 0.051 in. thick, were formed. While the piece obtained in the first run was not completely stretched, this was believed to be more the fault of the sharp corners of the die. The keel die mentioned, of a rather difficult shape, presented the same problem, but a most satisfactory stretch was obtained.

From the tests conducted, it was confirmed that the success or failure of this or any other metal stretcher depends largely on the operator's understanding of the behavior of sheet metal when subjected to the forces exerted by this type of machine. Secondly, he must know completely the various factors controlling the operation of each pressing member and he must know his machine's capacity and its limitations.

Machine Details

The main platen, which is 100 in. long by 12 in. wide, is raised and lowered by two double-acting hydraulic cylinders of 150 tons total capacity and 24 in. stroke. These cylinders, which are located one at each end of the platen, may be raised or lowered independently of the other. Positioning of the clamp jaws is effected by four gear motors one at each corner, driving threaded shafts which give an individual stroke adjustment of 43 in. In addition to this, another movement of 18 in is provided by hydraulic cylinders two at each end of the press, having a total pulling capacity of 21 tons. Return lines on these clamp actuating cylinders are piped through two adjustable pressure relief valves, which control the horizontal movement of the clamps in line with the tension in the sheet. The clamping action of the jaws, which are 84 in. wide, is produced by hydraulically energized toggle joints. To insure positive gripping action, the face of the toggles against which the metal sheet lies is surfaced with a bead running the full length of the jaws. The clamps may be angled up to 15 deg. in a horizontal plane.

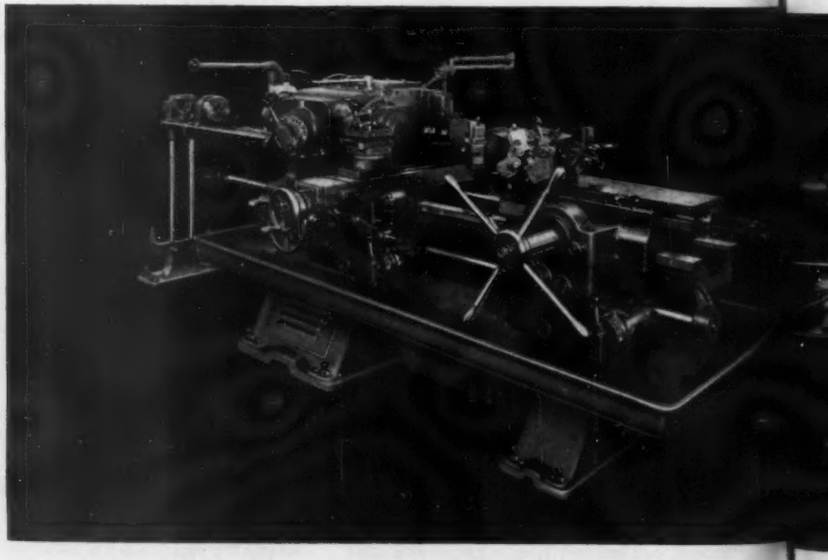
The operation of this press is conveniently handled from a compact control stand on which are located the hand levers and push-buttons controlling the many adjustments required. From his vantage point, the operator can readily see and accurately control the movements of the stretching members.

Pressure is generated for the H-P-M open circuit operating systems by two Hydro-Power radial pressure generators and one Hydro-Power gear pump.

NOT- *How much can be*

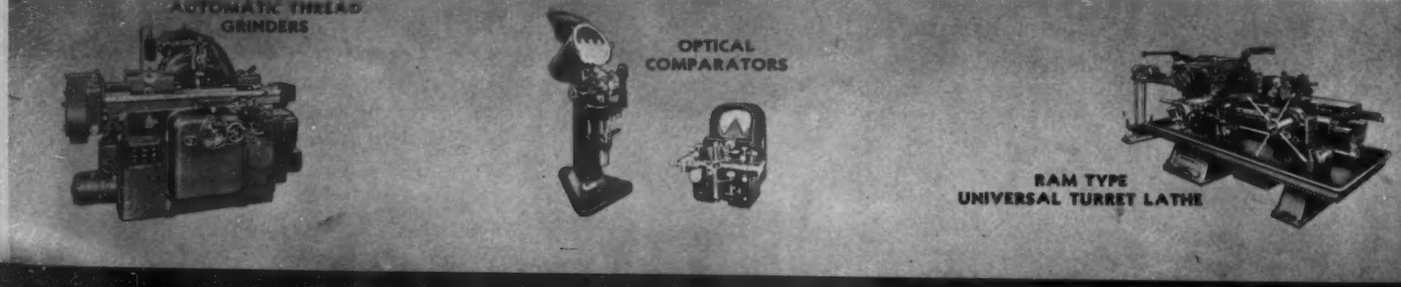
IN 1895, James Hartness, designer of the Jones & Lamson Flat Turret Lathe, told a friend: "Our method of selling was to go into a plant, compute their present costs, and say that we would send a machine, on trial if necessary, and they could send us the savings per month. On this basis we sold many machines, but it soon reached a point where that was not necessary, for people knew what could be accomplished."

JONES & LAMSON



Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers

No. 3 Jones & Lamson Ram Type Universal Turret Lathe with standard bar equipment.



saved, but-

HOW MUCH MORE?

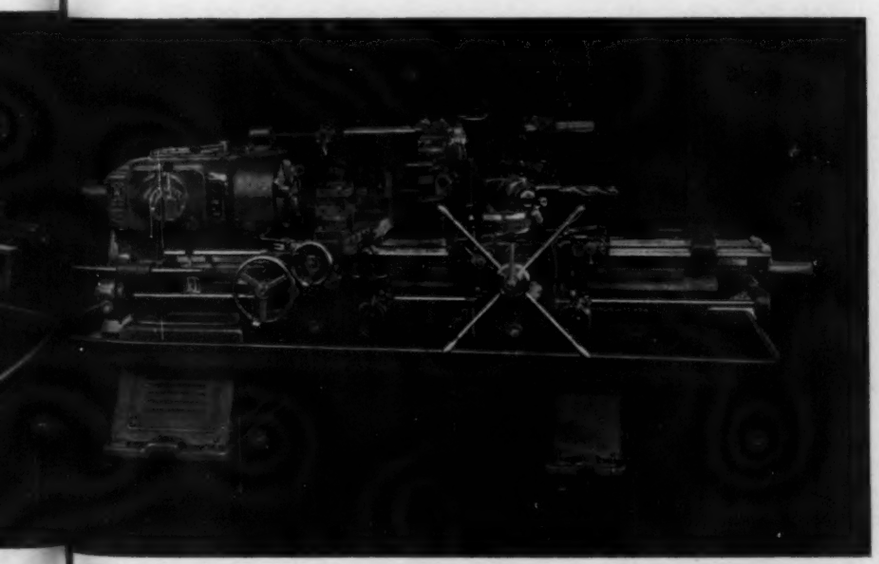
THE flat turret lathes of '95 developed by James Hartness are made no longer, but new Jones & Lamson Turret Lathes — faster, more precise, more rigid and easier to operate than ever — are paying for themselves *over and over* out of savings.

No longer does a skeptical world demand such money-saving equipment from its makers on trial. The big question today is not how much can be saved by Jones & Lamson equipment, *but how much more* when equipment and production plans are co-ordinated by Jones & Lamson methods.

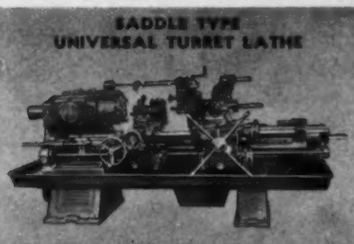
That is why progressive manufacturers habitually put their production problems up to Jones & Lamson engineers. That is why such plants, planned and equipped to meet today's emergency, will be in strategic position to face the harsh competition that is bound to follow this upheaval.

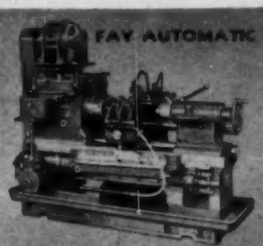
Why not see what Jones & Lamson engineering and Jones & Lamson machines can do to put your plant in such a strategic position? Inquiries from large concerns or small receive thorough, detailed study here, and illustrated catalogs are available.

MACHINE COMPANY - *Springfield, Vermont, U. S. A.*



7A Jones & Lamson Saddle Type Universal Turret Lathe with standard chucking equipment.

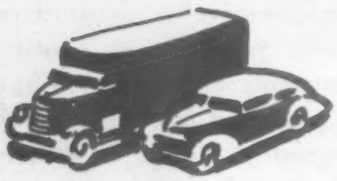




PROFIT PRODUCING
MACHINE TOOLS

Assembly Line . . .

• Detroit plants have capacity for more war contracts . . . Auto industry said to be producing more plane parts than aircraft industry can now absorb for final assembly.



DETROIT—After it had been widely proclaimed that Detroit had reached the saturation point in war contracts because of impending labor shortages, it now appears that burgeoning production has resulted in lowered man-hour estimates, revisions in man-power figures and increases in material requirements —and that more contracts can be placed in this area if good judgment is used.

Authority for the statement is Ernest Kanzler, chief of the automotive branch and regional director of the War Production Board in Detroit.

In recent weeks the first indication that many earlier estimates might be revised came when some automotive firms, making new contracts with the government or engaged in scaling down the prices charged on previous contracts, asserted that their "know how" in mass-production had enabled them to cut many corners and reduce costs and time on the jobs they had undertaken.

Mr. Kanzler cited one of these, an aviation company that took orders on two items on the basis of 9000 hr. and 4950 hr., respectively, a total of 13,950 hr. for the two jobs. The company has now taken repeat orders on each of these items on the basis of 3000 hr. each, a total of only 6000 hr. This is a 57 per cent cut on original estimates which were based on the then-current manufacturing practices outside the automobile industry. Another estimate which was proved pleasantly wrong when production got underway is in a bomber plant which planned 60 assembly fixtures, actually ordered 40, but finds out now that it doesn't need all of the 40 to meet its schedule.

As Kanzler points out, these mean, first of all, that labor requirements are sharply reduced. An over-all reduction of 25 to 30 per cent is possible, he indicated, in the earlier estimates of 830,000 to 840,000 men required for war work in this area. Such labor requirements will be far more than in the peak years of Detroit's peacetime production, but still offer considerable relief from the load that had been anticipated.

Need for re-survey of man-power requirements became apparent when incoming orders for war work in Detroit dried up because the Defense Site Board in Washington believed that the saturation point here had been reached. Kanzler has undertaken such re-surveys, with 25 of the largest manufacturers in this area (accounting for 67 per cent of factory employment) scheduled to report monthly figures, project by project, to the United States Employment Service, along with estimates of peak demands on each project.

Some recent estimates of national man-power requirements have been brought back from Washington by Kanzler. These follow:

In war work, Jan. 1, 1942	7,000,000
To get into war work in 1942	12,700,000
Total	19,700,000
Less number to join armed forces this year	2,200,000
Net war industries employment at end of 1942	17,500,000

This will mean a gain of 10,500,000 workers in war industries during the year.

Still, the greater number of industrial workers will be in non-military work, the estimate being 26,500,000, and another 8,000,000 will be in agriculture. Adding it up:

In war industries	17,500,000
In non-military work	26,500,000
In agriculture	8,000,000
In armed forces	4,200,000
U. S. citizens who are pretty sure to have some kind of a job to keep them busy	56,200,000

With man-power demand so great, it is not surprising that there came from three important sources last week indications that something soon would be done to control needless shifting of workers of all sorts from one job to another. Mr. Kanzler said that he would not be surprised to see a labor rationing program set up by the Man Power Board, to be handled in the field by the United States Employment Service, under which "labor pirating" would be ended and manufacturers would have to hire workers, especially skilled workers, on an allotment basis with the government controlling the allotment. Kanzler declared that too many plants are competing in the open market for trained men and are refusing to train their own skilled labor. He cited two local tool shops, one of them an off-shoot of the other, both doing the same kind of work, for the same customer, and one of them "stealing" skilled men from the other by the simple expedient of offering boosts in hourly rate.

Kanzler's prediction that the hiring would be controlled through the requirement that employers' get a quota from the USES before it could hire workers differs from reports emanating a little later in the week from Washington where it was said that workers would be frozen to their jobs and that the USES would become the "sole hiring agency for critical skills in critical areas." In this report it was indicated that henceforth workers would be "unable to change from one war plant to another without approval of the United States Employment Service."

The objective in these two instances is the same, that is, to cut down the unnecessary labor turnover, but the methods are different in principle and practice. The second suggestion (freezing workers to their jobs) brought with it some talk of an arrangement to equalize pay rates, so a worker might be recompensed for his inability to move from what is now a relatively low-paid job, to a higher one. The Kanzler outline of the plan for freezing the employer's right to hire new men had no such feature. (Incidentally, it is a little erroneous to say that the Kanzler proposal would freeze the employer's right to hire men. More correctly, it would force him to

BULLARD
MESSAGE TO
MEN IN A HURRY
THIS Mult-Au-Matic is in a plant that was an empty field only eight months ago.
The parts are Wright Cyclone crankshaft sections. Here's what the plant manager says about the Mult-Au-Matic shown in the job: ". . . a 15-ton Bullard Mult-Au-Matic does seven operations at once; it turns, faces, bores, reams, counterbores, recesses and chamfers."
Whenever there is lots of work to be done, in a hurry, you'll usually find Mult-Au-Matics in the key positions.
THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

hire unskilled labor and train it into skilled work.)

The third pot shot at "pirating" came from Marriner S. Eccles, of the Federal Reserve Board, who declared that competitive bidding by employers for labor is doing more to push the general level of wages upward than all the combined efforts of union leaders.

Paul V. McNutt, man-power chief, also attacked last week the evil of "piracy" in hiring industrial workers.

Aircraft production in Detroit has been accelerating rapidly, but there comes again further evidence that automotive plants are producing more aircraft parts than some of the airplane companies can absorb for final assembly. This helps to account for the fact that one small group of Briggs workers was scheduled for only four days of work last week on aircraft parts, despite the fact that in most instances Memorial Day shut-downs were abandoned and production kept on as usual during the holiday.

Murray also has reduced its operating rate in effect by abandoning seven-day operations for the time being and operating on a six-day week (48 hr.) basis. It remains, however, on schedule or ahead of schedule on every single item.

It has also been learned that 900 aircraft engines, built by an automotive firm, are stored by one aircraft company waiting to be installed in airplanes. Design changes and "adjustments" by military and company engineers are holding back the assembly of the airplanes themselves, thus accounting for the surplus of engines.

Other sources have reported that output of airplanes in the aircraft industry is running ahead of schedule. Specifically, there was a recent report that a type of plane (for which both Briggs and Murray supply parts, including wing panels) are 70 per cent ahead of schedule, with Boeing, Vega and Douglas each operating plants to produce this airplane in the West.

WITH Detroit demonstrating so capably that its "know how" *does* work on aircraft production and other war jobs—and with man-power requirements being scaled down—it appears that Detroit still will be available for the placing of further war contracts, although it is now indicated that this area will be reserved for certain more difficult types of contracts requiring a great deal of engineering skill and production experience.

It also means that housing and transportation demands will be a little bit less severe than originally anticipated.

But, with the smaller number of workers able to turn out a greater number of pices, demand for materials will be stepped up and this is going to require some more figuring all along the line.

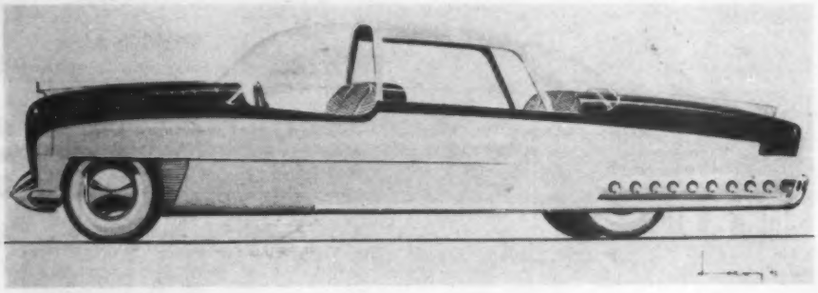
Some of the recasting of figures discussed above has been done in connection with planes for a huge airplane engine plant which Chrysler is expected to operate in the Midwest. This in the past has been described as a $100,000,000 project involving a two-million or three-million sq. ft. building, and more recently has been labeled bigger than the Ford Willow Run bomber plant. This project was temporarily held up because Washington did not want to see huge structural steel requirements and other materials requirements forced on already over-loaded supplying industries. However, late last week Chrysler announced that a new type of factory design for one-story reinforced concrete construction had been developed by Chrysler plant engineers and that work would now go ahead on the plant. This announcement stated that the new war plant will be "the largest plant area under one roof that has ever been built."

The new construction is designed to save steel. Insteal of 5 to 12 lb. of steel per sq. ft. of floor area, generally used in conventional structures, the new design requires only 2.7 lb. of steel per sq. ft. of floor area, to reinforce the concrete. Steel savings are estimated to be great enough to build 14 destroyers or six 10,000-ton cargo ships.

The construction will make use of a new type of overhead arch-rib that will economize on reinforcing steel and at the same time provide ample room in the building for attachment of monorail trolleys, hoists, pipe lines, etc. The building will also make use of a new "victory sash" made of wood, instead of steel sash. Finally, the project will save about 125 tons of steel by using a new type of wooden picket fence which cannot be scaled. The fence around the plant will be almost four miles long and will eliminate the use of that much chain link fence.

A TIDBIT—Heinz, famous maker of the 57 varieties, is apparently going to go into production of aircraft or aircraft parts. Recently a noted aircraft engineer, Ralph Upson, an experienced specialist in heavier-than-air and lighter-than-air design work, left Detroit and his friends are wondering whether pickles are to be streamlined or cucumber warts converted to aluminum rivets.

An increase in experimental work on the use of cold reduced carbon steel sheet and low alloy sheet to replace aluminum alloy sheet in aircraft work is expected here as a result of instructions received by Detroit firms from the War Department. The instructions, in a letter apparently sent from Wright Field to all firms engaged in aircraft fabrication, called attention to the necessity for conserving aluminum.



Acme Photo

AFTER THE WAR IS OVER: Here is a preview of what the post war automobile will look like, according to one industrial designer. The power to weight ratio will be improved, and from the looks of the car it seems that plastics will also play a big part in the design.

BULLDOG TROL-E-DUCT SYSTEMS

SPEED ASSEMBLY LINE AND BENCH PRODUCTION with Mobile Light and Power

This picture tells its own story. Power for portable tools moves along with the job—workmen have light *exactly* where they need it—in plants equipped with BullDog Trol-E-Duct Systems.

These two great systems, pioneered by BullDog, solve many troublesome problems of bench and assembly line production. No long, dangerous cords or cables. Nothing to trip over. No fumbling for connections. BullDog Industrial Trol-E-Duct delivers power by the shortest route. Light tools need only a few feet of cord. Heavier tools, requiring support, are suspended direct from the trolley overhead. And in a parallel run, Universal Trol-E-Duct provides movable lighting all along the line.

More Speed — Greater Safety — Lower Cost

Hundreds of war production plants, large and small, are using BullDog "Plug-in" Light and Power for good *dollar-and-cents* reasons. BullDog Systems are easily installed—conserve critical materials. They are 100% salvable. They speed production—cut maintenance costs. Write for descriptive bulletins. And remember that BullDog engineers, conveniently located in 30 cities, will if you wish take off your hands the whole job of designing a complete flexible electrical distribution system.

Note the parallel runs of Bull-Dog Industrial and Universal Trol-E-Duct over the cutting bench in this great military clothing manufacturing plant. Power is tapped and lights are suspended from movable trolleys. Inset photo shows Universal Trol-E-Duct trolley assembled to Plain Tool Hanger with removable side plates for ready access to wiring connections.

BULLDOG
ELECTRIC PRODUCTS CO.
DETROIT, MICHIGAN
BullDog Electric Products of Canada, Ltd., Toronto, Ontario

ORIGINATORS OF FLEXIBLE ELECTRICAL DISTRIBUTION SYSTEMS FOR LIGHT AND POWER

Washington . . .

• In order to spend the millions of dollars budgeted to them, government departments are engaging in all sorts of piddling activities and hiring thousands of unnecessary workers.

WASHINGTON—"The office of government is solely to maintain justice between man and man and between nation and other nations. It should have nothing to do with carrying letters, supporting schools, digging canals, constructing railroads, or establishing scientific institutions. Its business is simply to suppress villains, foreign and domestic.

"The people are to be left absolutely free to work out their welfare in their own way, free especially in all departments of industry from the paralyzing touch of governmental patronage.

"Government cannot do anything in the way of internal improvements so well, so cheaply, so exactly at the right time, as the people themselves. And if the people have not within themselves the energy, the intelligence, the virtue requisite for the development of their resources and the improvement of their minds, and the instruction of their children, no machinery of government, no power from above or from without can do it for them.

"Let government confine itself to its own duty of compelling the faithful performance of contracts and the protection of every man in his rights and leave the rest to the people."

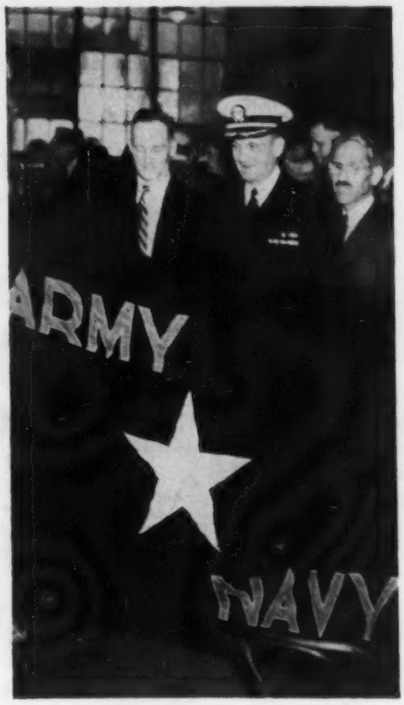
THE foregoing "radicalism" came from the pen of Thomas Jefferson. In this time of stress, and overwhelming burden of taxation, it would be an "interesting experiment" to try to apply the principles of Jefferson who considered himself as a strict constitutionalist, and a states rights man. Of course, the application of the principle could be stretched a little to allow the continued existence of most of the war agencies in this period of emergency, and just embrace the old line departments which are not "non-defense" expenditures according to the President.

Yet it is obvious that heavy slashes can be made in the following appropriations for departments:

Agriculture, $1,000,000,000; Labor, $25,640,567; Interior, $71,297-366; Commerce, $82,091,063; Federal Security Agency, $760,994,084; Federal Works Agency, $42,854,-410; Post Office, $901,732,180, etc., for a total of nearly $3,000,000,000. As for CCC, NYA and WPA, to mention only a few boondoggling outfits, they should be entirely abolished. To no avail this recommendation has been made by the Byrd committee. The committee estimates more than $2,000,000,000 could be saved if the administration was willing to pare superfluous costs.

OF course as time goes on more economies than these could be worked out of our present budget, if really strenuous attempts were made. The Weather Bureau and the National Bureau of Standards, and a few other standby establishments such as the Bureau of Animal Industry, and the agricultural researches in plants, insects and goods, not to say anything about inspection services of all kinds, would be missed. But about $150,000,000 would take care of these. As it is, some government agencies are frantically trying to justify expenditures and puffed up payrolls by engaging in all sorts of piddling activities. An example is the Federal Trade Commission.

Now Leon Henderson has made a modest request on Congress. He wants funds for a police force of 90,000 employees, later to be tripled, it is strongly suspected. They are wanted to spot violations of the nation-wide price regulations, cover-



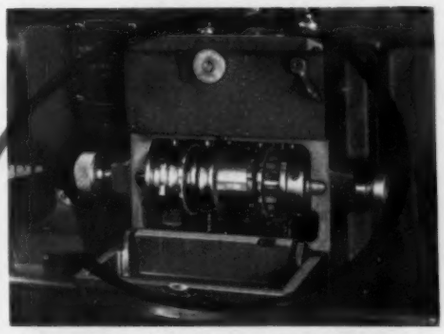
FIRST JOINT ARMY-NAVY AWARD: Cleveland Twist Drill Co., Cleveland, was the first company to receive the new joint Army-Navy award for outstanding production.

TRIPLE "E" AWARD: The button being affixed to the lapel of John Fitzmaurice, veteran workman, is symbolic of the triple award of the Navy "E" to Torrington, Waterbury and Ansonia plants of American Brass Co., subsidiary of Anaconda Copper Mining Co. The plants make certain equipment for fighting ships.

CINCINNATI

You Don't Need a Toolmaker

TO RUN AN O-8 MILLER



Above: Boss of the feed cycles. Cycle selectors may be changed in a minute or two.

Right: CINCINNATI No. O-8 Plain Automatic Milling Machine with automatic rise and fall spindle carrier.

When you find it difficult to hire toolmakers and first class machine operators, then you appreciate machine tools having that intangible quality "built in skill", coupled with as many automatic features as compatible with your production requirements. These two factors—both of which are prominent in CINCINNATI O-8 Millers—go a long way towards keeping your assembly line running smoothly.

In the illustration above, the operator is milling screw driver slots in small screws. There are only two things for him to do—load the fixture and flip the starting lever (clamping, unclamping, and ejecting are automatic with the movement of the table).

The machine automatically goes through the cutting cycle, and returns the table to the starting point. The complete cycle requires only .08 minutes, hourly production depending largely upon the dexterity of the operator in loading the fixture.

This machine is not a single purpose installation—far from it. By merely changing the cycle selector (a matter of a minute or two), almost any conceivable feed cycle can be obtained.

Write for catalog M-828. It contains the complete description and specifications for CINCINNATI No. O-8 Plain Automatic Milling Machines.

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

ing almost every production in the land. The cost to the taxpayers for this regimentation which inevitably will collapse partially or wholly of its own weight, will be greater than the cost of being chiseled by the odious war profiteers.

The agriculture department perhaps most of all agencies would smart under the restriction on expenditures. This department has done more to socialize the country than any other, with the majority of its appropriation devoted to syphoning tax money from the haves to the have-nots. It would resent not having 19,000 automobiles to ride around in, and an extensive budget for "interpretive writers," and political traveling.

IT is also a fact that the defense agencies themselves swarm with unnecessary workers. Washington with its 250,000 civilian government payrollers has become a bedlam, and a hive of confusion. Yet at least 25,000 more are scheduled to take up camp in the nation's capital. Since housing has already become acute, even the brain trusting planners are at their wits' end to find places for them to live. This means more houses and dormitories can be built at further vast increased cost to taxpayers.

But every effort to get the administration seriously to go at the business of economizing has gotten nowhere. Prospects are that it never will unless the public is shaken out of its complacency toward reckless government extravagance.

Nevertheless, economy by cutting off unnecessary and tremendous expenditures would give the people greater faith in the sincerity of the war effort. It would stimulate morale much more than possibly can be done by the $70,000,000 publicity army with its battalions of mimeograph machines.

NAVY "E" TO JEFFREY: O. R. Ehret, oldest employe of Jeffrey Mfg. Co., Columbus, is shown receiving a Navy "E" button from Commander G. H. Bowman.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

GOOD MORNING! THERE'S A FEW MATTERS HERE THIS MORNING!
YES, YES, SO I SEE!
BY NOON THAT SUIT'LL LOOK LIKE HE SLEPT IN IT--TH' HAT'LL BE TURNED SIDEWAYS AND TH' COLLAR WILTED! HE'LL LOOK WORSE THAN HE USED TO LOOK AFTER A DAY OF LEANIN' OVER ALL TH' MACHINES IN TH' SHOP!
YEH, I KNOW-- HE ONLY HAS TO LEAN OVER ONE DESK NOW, BUT IT'S WORSE THAN FIFTY MACHINES! GETTIN' HIMSELF IMMACULATE EVERY MORNING IS A DAY'S WORK FOR HIM!
THE OLD IRON MAN
J.R.WILLIAMS
6-5
COPR. 1942 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

WPB Bulletin Aims to Increase Plant Efficiency

Washington

• • • **For the purpose of increasing** the effectiveness and efficiency of small and medium size manufacturing plants and their employees, the War Production Board has printed a 40-page bulletin under the title "Plant Efficiency." It contains a group of suggestions, ideas and plans that will prove helpful in some plants and which are applicable in a wide range of industries.

Some of the topics covered are lighting, cutting down accidents, adapting old machines to new machines, maintenance and repair, getting the most out of machine tools, extending the life of cutting tools, training workers, swing shifts, production and material control, plant protection, pooling facilities and advice as to how to get into war work. The bulletin may be obtained from the Division of Information, War Production Board, Washington.

More Construction By War Department Authorized

• • • **The War Department** announced May 29:

1. Authorization for the construction of a depot warehouse in Louisiana to cost in excess of $3,000,000. Construction will be supervised by the New Orleans district office of the Corps of Engineers.

2. Authorization for the construction of a cantonment at Grenada, Miss., to cost in excess of $3,000,000. Construction will be supervised by the Vicksburg district office of the Corps of Engineers.

3. Award of a contract to the United States Rubber Co., New York, for consultant service in connection with a manufacturing plant in Wisconsin.

4. Authorization for the construction of an air force training school at Laredo, Texas, to cost in excess of $3,000,000. Construction will be supervised by the Galveston district office of the Corps of Engineers.

5. Authorization for the construction of an air force training school at Yuma, Ariz., to cost in excess of $3,000,000. Construction will be supervised by the Los Angeles district office of the corps of Engineers.

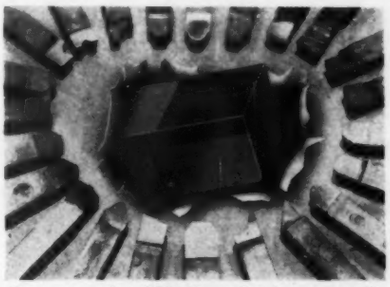
USE THIS METHOD TO GRIND CARBOLOY TOOLS QUICKLY—EASILY—EFFICIENTLY

Correct grinding of Carboloy tools is important! A poor grind wastes carbides, delays vital production and increases costs. A good grind provides long, trouble-free life between tool changes, conserves tools and speeds production.

When established procedure is followed, Carboloy tools can be ground quickly, efficiently and just as easily as ordinary tools. Below are a few of the more important points to observe. Detailed instructions are available upon request. These are contained in a 32-page manual on Carboloy tool design, application, brazing and maintenance.

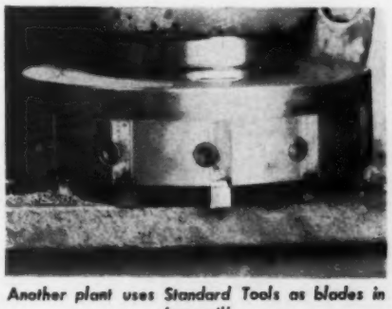
Use Standard Tools for Economy, Flexibility and Prompt Delivery

Carboloy Standard-Stock tools are available in 10 styles, a wide range of sizes and in general purpose grades for steel, cast iron, non-ferrous metals and non-metallics. They are adaptable to 80% of all turning, facing and boring jobs.



One user makes 200 "Specials" from one style of Standard

Many users maintain a stock of these standards in their tool crib and quickly grind to special shapes as required, ready for the job usually in less than one hour. One user (see cut) quickly adapts 200 special shapes from one style of Carboloy standard tool. Another (see cut) uses these standard tools as blades in face mills.



Another plant uses Standard Tools as blades in face mill

For a short cut to speed up—use Carboloy Standard Tools. Catalog GT-140.

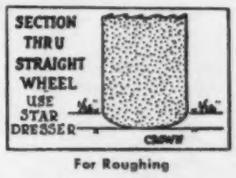
1. Use Correct Grinding Wheels

Use only the soft silicon carbide wheels recommended by wheel manufacturers or your carbide tool supplier. The following wheels are recommended for grinding single-point straight shank Carboloy tools:

	Wheel Specifications	
ROUGHING	*Carborundum*	*Norton*
Silicon Carbide Wheels (Not recommended in sizes less than 10" dia.)	G-60-R-W	3960/1 I 7
Diamond Wheels (For Carboloy Tip)	100	100
FINISHING		
Silicon Carbide Wheels (Cup)	G-100-S-W	39100/1 H+7
LAPPING		
Diamond Wheels	240 Grit	220 Grit

2. Dress Wheels for Rapid Stock Removal

Correct dressing of wheels is important in safely obtaining rapid stock removal. Method shown enables you to keep area of contact against tool at a MINIMUM—avoiding generation of excessive localized heat—an absolute essential when grinding safely and rapidly.

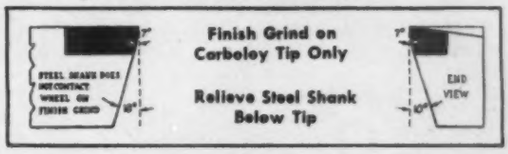


For Roughing

For Roughing and Finishing

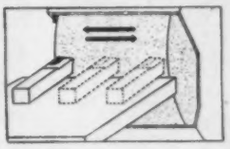
3. Use Double Angles to Insure Good Finish

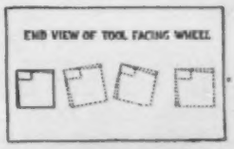
When rough grinding, ALWAYS grind side and front relief angles 2° to 5° greater than finished angle desired. By this you avoid grinding on the steel shank when finish grinding. Steel loads wheel rapidly—prevents you from obtaining best possible cutting edge (Use regular abrasive wheel for grinding steel.)


STEEL SHANK DOES NOT CONTACT WHEEL ON FINISH GRIND
Finish Grind on Carboloy Tip Only
Relieve Steel Shank Below Tip
END VIEW

4. Important! Keep Tool Constantly Moving

The following movements prevent excessive localized heating in the Carboloy tip and assure uniform wheel wear: Keep tool moving back and forth across wheel at all times while roughing, finish grinding and lapping. Keep tool ROCKING during roughing and finishing, as shown.

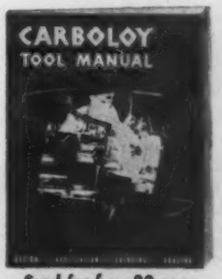




General Hints

If top face needs grinding, always grind it first. Then grind: (1) Front relief; (2) side relief; (3) radius. Complete each cycle for roughing, finishing, lapping.

Use rigid, carbide tool grinders equipped with adjustable table rests and graduated dial to obtain correct angles.



Send for free 32-page general tool manual

CARBOLOY COMPANY, INC.

11153 E. 8 MILE AVE., DETROIT, MICH.

Chicago • Cleveland • Los Angeles • Newark • Philadelphia
Pittsburgh • Seattle • Worcester, Mass.

Canadian Distributor: Canadian General Electric Co., Ltd., Toronto, Canada

CARBOLOY
Reg. U.S. Pat. Off.
CEMENTED
TOOLS - DIES - DRESSERS
CORE BITS - MASONRY DRILLS
- WEAR RESISTANT PARTS -
CARBIDES
FOR THE MANUFACTURING · MINING · TRANSPORTATION · CONSTRUCTION INDUSTRIES

WEST COAST.

• Airplane firms want better draft deferment policy . . . Plan to freeze workers to their jobs is viewed with suspicion by unions . . . Kaiser will build another magnesium plant.

SAN FRANCISCO — Tied up with accusations by southern California aircraft manufacturers that shipbuilders in the neighborhood are pirating their workers are claims that shipyard workers are receiving better treatment from the draft than is aircraft labor.

According to the aircraft people, a critical list of employees subject to deferment has been set up by the shipbuilding industry and is recognized by the draft boards. The airplane companies and their subcontractors say they have been suffering because no such well-defined list of occupations has been established in their field.

With roughly three-fourths of the aircraft workers in the southern California district less than 30 years old, the draft problem is an important one—and just as complex as job freezing. Although the announced selective service board policy is to replace younger workers with older men and with women, this cannot be done over-night. Some form of draft deferment standardization seems essential.

Although the aircraft manufacturers—Douglas in particular—have received wide publicity for their protests that shipbuilders were luring aircraft workers with higher wages, the labor situation has been even more of a problem to aircraft sub-contractors and parts makers. This group not only has been unable to meet the shipyards' pay, but is unable to offer such steady employment. A plan has been worked out by the parts manufacturers to eliminate pirating of labor from each other, however. The major aircraft companies are cooperating with this plan. Under the agreement, no company will accept an employee who has departed from another plant either for higher pay or without a legitimate reason. Before an employee is hired by another company in the group, he must have a letter showing the reason for his termination. Increased switching is taking place because of transportation difficulties, and the companies in the group are exchanging employees for this reason whenever feasible.

THE plan to freeze workers to their jobs by national regulation is viewed with some suspicion by the unions, not because they object to job freezing, but because they believe it may lead to wage freezing. Out of this distrust of the government freezing jobs may come a plan from the unions themselves to freeze their own workers.

Job freezing is nothing new with some types of work. Merchant seamen and longshoremen, already have stabilized, voluntarily, some of their work. Getting his job through a hiring hall, a seaman goes on the ship assigned to him by the union. In the eyes of West Coast longshoremen, it is a serious offense for a member to change gangs very often.

Such a publication as the "People's World," published on the Pacific Coast, suggests that "if the shipyard unions and others in defense industry would even now step forward with such voluntary regulation of work, the government would not have to consider any new move in their cases."

Conducted impartially, the job freezing plan may develop a few creaks, but in the long run will probably be accepted with good grace all around. A year or two ago, workers were crying for "security of employment." Now, employers are crying for "security of employees." The job freeze gives it to them.

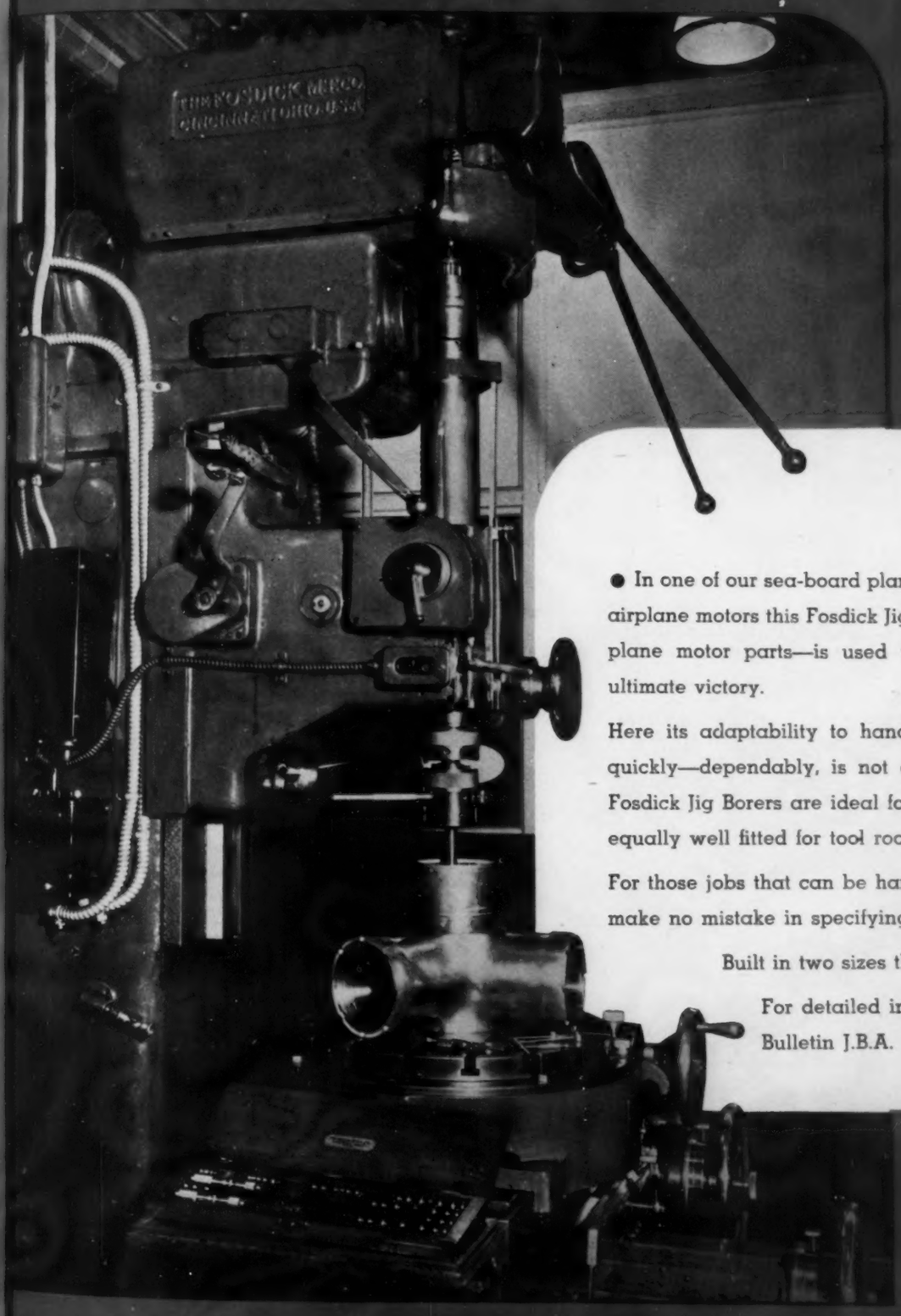
PROPONENTS of the two 10-hr. shift day in the shipyards lost more ground last week when all departments in the California Shipbuilding Corp. yard, Los Angeles Harbor, went back to eight hour shifts, three shifts a day, operation after some of the departments had tried the 10-hr. day. The men, themselves, who to some degree were attracted by the greater earnings from overtime on the 10-hr. shifts, reportedly showed impairment of efficiency and increased absenteeism and sickness.

"Calship" last Thursday broke its own record for hull construction set five days before by launching a 10,500-ton Liberty freighter in 57 days. The previous record, 63 days, was set by the yard May 23. Speed in outfitting is increasing, too. Of the 17 ships delivered to the Maritime Commission since the yard opened in February, 1941, eight were delivered in May. The first ship delivered by the yard was on the way 125 days.

Attorney General Biddle's decision to uphold the Harry Bridges deportation order happened to be timed nicely to make Bridges the successor to Earl Browder as the cause celebre of radical labor, but the net effect upon the war effort is likely to be bad rather than good. It is doubtful whether any genius but Bridges can speed his unions up again. Ever since the Allies were blessed by Russian entry into the war, Bridges and his lieutenants have been exhorting their satellite unions to high productive efforts but in several cases the men have not been able to reach the peak effort exerted prior to their slowdown to spread the work. At a recent Los Angeles production-for-victory rally, Bridges urged the workers to greater production in the war against the "Nazis, Fascists, Japanese and Trotskyites," according to the labor paper. To show how serious his henchmen are in

FOSDICK *Jig Borer*

HELPS KEEP 'EM FLYING



● In one of our sea-board plants engaged in manufacturing airplane motors this Fosdick Jig Borer is used to produce airplane motor parts—is used to help keep 'em flying for ultimate victory.

Here its adaptability to handling close tolerance work—quickly—dependably, is not only essential but profitable. Fosdick Jig Borers are ideal for this production job and are equally well fitted for tool room operations.

For those jobs that can be handled on a Jig Borer you will make no mistake in specifying Fosdick.

Built in two sizes the 30 and 30-A.

For detailed information, write for Jig Borer Bulletin J.B.A.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI ··· OHIO

their production drive, one of them accused a conservative AFL leader, who was seeking unionism-as-usual of being a "known Republican of the Hoover crowd." Among the Bridges' following, such an accusation is worse than robbery or murder.

CONSTRUCTION of another magnesium plant by Henry J. Kaiser's Permanente Metals Corp. is now definite. It will use the Pidgeon ferro-silicon process of reduction rather than the original so-called Hansgirg process used at the original Permanente Metals plant. (See THE IRON AGE, April 9, 1942, page 55, for a description of this process). Construction of electric furnaces to produce the ferro-silicon is already under way at another Permanente plant.

Meanwhile, at the original Permanente plant, raw material emphasis has shifted from magnesite to dolomite obtained from a northern California deposit. Nearing completion is a third plant at which dolomite will combine with sea water as a source of raw material. No reduction furnaces are part of this third plant, however.

Use of the ferro-silicon process at the newest plant does not mean that it will supplant variations of the Hansgirg process in all Permanente operations, however. It is now contemplated that both methods will continue to be used. Total combined production capacity has not yet been determined, it is understood.

Columbia Steel Co., United States Steel Corp. subsidiary, will operate a six million dollar steel foundry to be constructed by Defense Plant Corp. The new plant will have both open hearth furnaces and a small electric furnace, and will be capable of producing 30,000 tons of castings annually. Principal customers will be the Navy and Maritime Commission. Completion of the plant is scheduled for next spring.

Two different theories have been held by California manufacturers as how to best combat sabotage. Some believe that full explanation should be made as to the various means of sabotaging production so that honest employees will be able to detect suspicious actions which they would not otherwise notice. Other firms believe that it is better to keep quiet and that any explanation would merely serve to tempt unpatriotic employees to earn dishonest money. The latest quirk comes from the United Automobile Workers, CIO groups now attempting to organize southern California aircraft plants. The union proposes that a sabotage clause go into its contract with employers, reading:

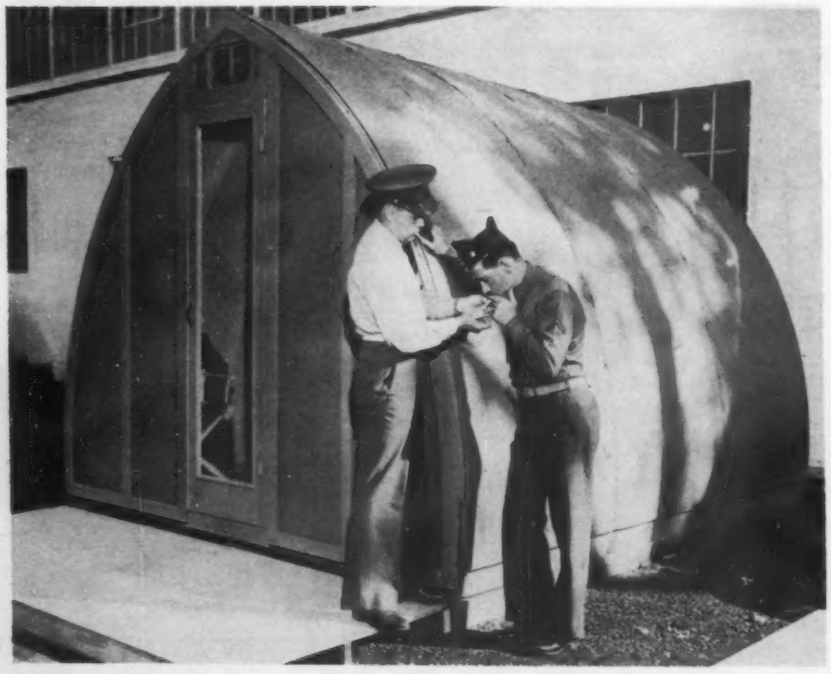
"The union and its members agree to report to the company any acts of sabotage, willful damage to, or theft of, any employee, company, government property or work in process or materials, or any threat of sabotage, willful damage to or theft of such property; and the union further agrees, if any such acts occur, to use its best efforts in assisting the company and the Government to determine and apprehend the guilty party or parties, and that either the act or threat of such sabotage, willful damage or theft shall be good cause for discharge."

This offer of the unions to police their own membership, if taken seriously by them, should have particular importance in the aircraft industry where subversive activity of this type is a constant threat.

The relative willingness of aircraft employers to make a wage increase, as reported by the unions, is causing concern among sub-contractors and suppliers. Compared to the principal aircraft manufacturers, which to a great extent assemble completed units, the sub-contractors spend from 50 to 60 per cent of their contract price on productive labor not taking into consideration office and technical personnel. Unlike the prime contractor, many of these suppliers operate under price ceilings. Consequently if the aircraft manufacturers raise wages, the sub-contractors will be on the spot to raise wages themselves.

PRE-FABRICATED BARRACKS: This barracks, designed by a California manufacturer, may be used as a two-man unit or, with others, placed end to end to form multiple housing facilities.

Acme Photo



Fair Named Head of Regional WPB San Francisco Office

• • • **Harry H. Fair,** San Francisco, has been named regional director of the War Production Board for California, Arizona, and Nevada. A deputy director will have jurisdiction over the Los Angeles industrial area and will have an organization of WPB specialists and experts paralleling the San Francisco staff. The San Francisco office will probably handle the administrative work for the Seattle area, as well as for the entire San Francisco region.

Mr. Fair is the eleventh regional director to be appointed in the establishment of thirteen regional offices throughout the country.

LATROBE

Metallurgical Service

...to help solve your tool steel problems

LESCO

★ Maximum Production is the goal of all industry today!

You can rely on the qualified assistance of an experienced *Latrobe* Metallurgical Engineer to help you secure *maximum production* from the tool steels you use. It's an advisory service —designed to lend co-operation NOW *when you need it most*, and without obligation on your part.

You may have a problem of selection, or of application. Or perhaps you need to substitute one composition for another. Or it may be a matter of heat treating that proves perplexing.

In any event, feel free to call upon *Latrobe!*

Latrobe ELECTRIC STEEL COMPANY

MAIN OFFICES *and* PLANT •• LATROBE • PENNSYLVANIA

Fatigue Cracks BY A. H. DIX

"S" Trouble

• • • Bill Sherman, the brains department's hired man in Detroit, and Peirce Lewis, the business department's ditto, showed us through the Detroit Engineering Society's new home. They didn't miss a broom closet.

If superlatives were rationed ours would be used up for the year. Our only criticism of the Detroit Taj Mahal is in the naming of the amusement department in the basement. The door to it is lettered "Games Room." The "s," it seems to us, is superfluous. True, the room has more than one game, but *game room* slides off the tongue more easily and saves time.

The post office department had the problem years ago when the parcel post system was established. Purists held out for parcels post, fearing the dropping of the "s" would give the public the impression that the system would handle only one parcel. But sanity prevailed.

The Roma, the 50c. table d'hote restaurant on Third Ave. near 45th St. has the same trouble, at least it did the other day when we were there with Jim Rowan, your favorite family journal's news editor. The menu read "clams cocktails," to make it plain to the customers that the cocktail contained more than one clam. We found this to be correct. It contained three.

Who Said It?

• • • John Howe Hall, ex-miler, metallurgist, and expert who-said-whoer, settles the dust with this:

> Deac is perfectly right. Farragut said "Damn the torpedoes." Dewey's quotable phrase was "You may fire when ready, Gridley." Your Detroiter, like the majority of Americans, is all wrong about Perry and "Don't give up the ship." That's what Lawrence said. Perry said, "We have met the enemy and they are ours."
>
> Putnam didn't say, "Don't shoot till you see the whites of their eyes." Prescott said it.
>
> And now, like Sam Weller as he left the witness stand in Bardell vs. Pickwick, "Would any other gentleman like to ask me anything?"

Aptronyms—Denture Division

• • • The president of the Los Angeles County Dental Society is, on the honor of R. Raymond Kay, your Southern California newshawk, Dr. Carl Molar.

D. W. Kaufman reports that the new president of the New York State Dental Society is Dr. James P. Ivory.

He Guzzled the Label

• • • Among the publishing business' less exciting duties is proofreading. As an average issue of THE IRON AGE contains some 50,000 words in the editorial pages alone, this is a weekly chore of king size.

Overdoses of proofreading induce a sort of mania. The proofreader finds it impossible to read anything for pleasure. Also, he finds himself trying to find errors in print in everything—inside as well as outside of office hours. He will read the fine type on commutation tickets and soap wrappers; he is unable to resist labels on ketchup bottles, sardine tins, paint cans, and whiskey bottles.

After an afternoon's heavy proofreading session a member of the brains department relaxed over a bottle of beer and unconsciously fell to dissecting the label. It was Peter Doelger's "Lambic" beer, with a label reading, "Net Weight 12 Fluid Ounces." Our man says this does not make sense, as a fluid ounce is a measure of volume—1/16th pint. Even though Doelger may be able to prove that a fluid ounce of his beer weighs exactly one avoirdupois ounce, he has lost a customer, because of inexactness of expression.

Cloudier and Funnier

• • • The printers had a field day with our Leon Henderson item of last week. The proof we O.K.'d read, *"Our brains department's . . . happy titling of news photographs."* It came out in the paper, *"tilting of news photography,"* probably the result of a typesetter's lunchtime session with a pinball machine.

He Said No

• • • Our contacts with the armed forces have been happy. We find their members energetic, progressive and courteous. Therefore, the experience a member of the brains department had recently can be marked down as exceptional.

He lined up a midwestern munitions plant as worthy of editorial treatment, and made the necessary arrangements for permission to make a plant inspection. All went well until he ran afoul of a certain major in an office controlling that particular manufacturing area. The major said haughtily, "No, I won't give you permission to inspect that plant. It may be visited only by those who can increase production."

Our man flowed around the major, got permission from higher up and made the inspection. Being something of a production increaser in his own right, he tipped off the plant manager to a certain new method he saw used in another munitions plant. Since then the plt. mgr. has long-distanced him four times. On the last call he was told, "That idea you gave us is going to cut our rejects 15 to 20 per cent."

Nail Lore

> You say you got only 9 ten-penny nails for a penny. One used to get 13. I know because I looked it up in the Sears Roebuck catalog, page 1048—10d Nails: 69 to the lb., 5 lb. for 26¢. —*H. F. Cotter, Tuscaloosa, Ala.*

We are no hoarder. We bought only one pound and paid the penalty for small-quantity buying. But our ten-penny nail was more robust. Ours weighed exactly ¼ oz., making 64 to the pound.

> In the old days one penny (which I presume was worth two cents) would buy 10 ten-penny nails. Now two cents buy only 18 ten-penny nails. And with all our modern nail mills—not very much progress.
>
> —*D. W. Kaufman, Halcomb Steel Division, Crucible Steel Co. of America*

The comparison is unfair. In the old days a penny was big money. Pay of a shilling a day put you in the upper tax brackets, and a dozen pennies rattling around in your jerkin brought the fairest to your table in the Jimmy Kelley's of the period.

Hushed Blurb

• • • As this is Noise Abatement Week we will do our boasting about the priority guide in six-point. The sixth edition is supplied as a separate 32-page section of this issue. The guide, invented by the brains department last September and widely emulated, has been phenomenally successful. Industry and the WPB have marked it for their own. So fervid is the praise of it that even we, whose encomium absorption capacity knows no saturation point, are abashed.

The present guide is larger and grander than any of its predecessors. It is, of course, revised right up to the hilt. Study of it will make you priority's John Kieran. Extra copies cost:

1 to 10 copies	50c. each
11 to 100 copies	40c. each
101 to 300 copies	35c. each
300 or more copies	30c. each

Stamps or coin with orders for $2 or less would lighten our load.

Stoppers

• • • Victory will be measured in gallons—*Koppers Co.*

Jim Eaton's speedboat is out hunting Japs—*Revere Copper & Brass, Inc.*

Puzzles

We thought that 12,345,679 was the only answer to last week's featherweight load on your cerebrum, but A. H. (Van der Horst Corp.) Baum and others point out that this is just one of 111,112 correct answers.

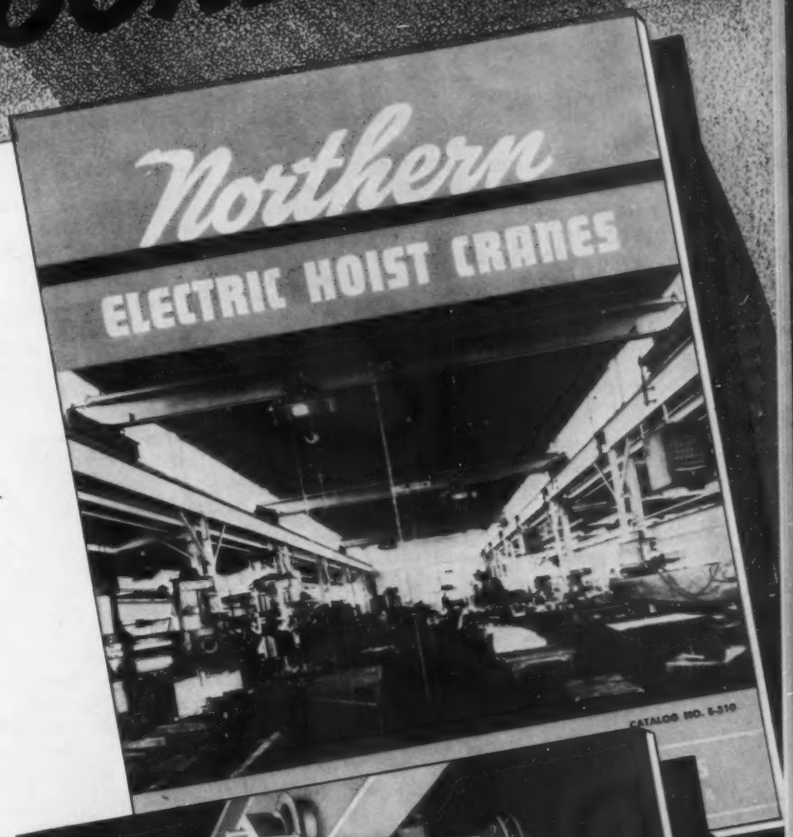
We have had complaints from the master minds that our problems are too easy. This one, sent in by C. S. (Westinghouse) Hague will help restore the balance:

A perfectly flexible rope hangs over a frictionless pulley. A weight is tied to one end and at the other end hangs a monkey of equal weight. The rope weighs four ounces per foot. The combined ages of the monkey and its mother equal four years, and the weight of the monkey is as many pounds as the mother's age. The mother is twice as old as the monkey was when the mother was half as old as the monkey will be when the monkey is three times as old as its mother was when she was three times as old as the monkey was. The weight of the rope plus the weight is half as much again as the difference between the weight of the weight and the weight of the weight and the weight of the monkey.

How long is the rope?

Send FOR THESE BOOKLETS

ON ELECTRIC HOIST AND HOIST CRANES



Electric Hoist Cranes are economical in first cost, easy to handle—are built in various capacities up to those large enough to move 15-ton loads.

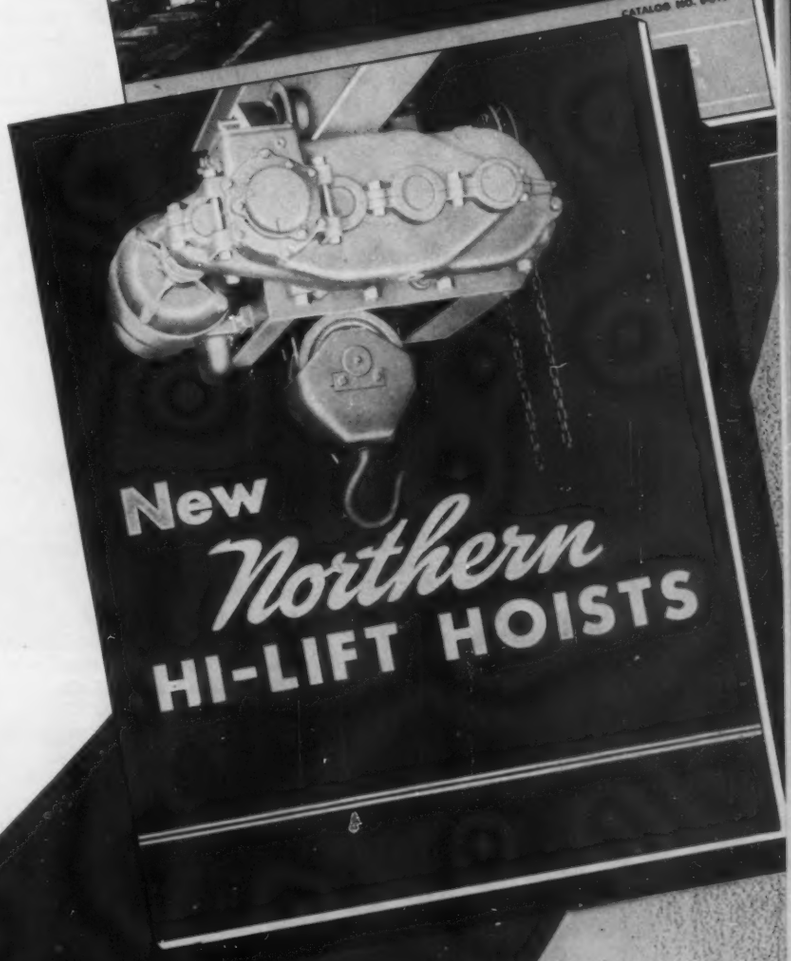
They may serve as auxiliary handling equipment in connection with large overhead traveling cranes in large plants, or may move all of the material in small plants.

The Northern Hi-Lift Hoist

The essential feature of these Cranes is the Northern Hi-Lift Hoist, a modern low headroom hoist built with machine tool precision. Outstanding in design and construction, it gives maximum hook lift, assures continuous operation, provides positive control and safer handling.

The Northern Electric Hoist Crane is built in many different types, including cab or floor control.

We furnish the Crane complete, or furnish the Hoist and end trucks plus necessary accessories and drawings. In this case you can save freight by buying the girder locally.



★ *Write for copies of these books*

NORTHERN ENGINEERING WORKS

General Offices:

Atwater St., DETROIT, MICH.

NORTHERN CRANE & HOIST WORKS, Limited
WINDSOR, CANADA

Offices at—44 Whitehall St., NEW YORK • 547 [illegible] • [illegible] West Central Parkway, CINCINNATI • 4135 Gratiot Ave., ST. LOUIS [illegible] • [illegible] University Ave., ST. PAUL

Dear Editor:

ON THE MAHARAJAH OF SWAT

Sir:

I have just read your editorial, "History Repeats", in the May 21 issue.

Only too often have I felt myself in the position of the elephants. The truth of your statements strikes home so firmly that I would appreciate your kindness if it would be possible to send me two copies of this editorial suitable for framing, as I feel that such genius as this should not remain concealed within the pages of THE IRON AGE, but should be emblazoned upon the walls for all to see.

R. E. KNIGHT,
Liaison Officer,
British Raw Materials Mission,
New York.

Sir:

We would greatly appreciate a reprint of the full text of the editorial, "History Repeats", as it appears in the May 21 issue.

It seems to say it all—in fact, we would appreciate two copies if that is in order.

EDW. H. SEYBERT,
Dist. Sales Mgr.,
Allegheny Ludlum Steel Corp.,
Indianapolis.

Sir:

Your editorial, "History Repeats", was greatly enjoyed in our office and we should like to have about 15 reprints of it.

Leggett & Platt Spring Bed & Mfg. Co.,
Carthage, Mo.

ELECTROLYTIC TIN

Sir:

Among the magazines which I regularly look through at the Engineering Library is THE IRON AGE. The article on production of tin plate by electrodeposition in the issue of April 30 was a revelation to me, and I want to get a copy of that issue to have at hand to refer to at any time.

Enclosed are two dimes which, I trust, is sufficient to pay you for a copy of that issue and the cost of mailing it.

Past the age limit for teaching at the University of Wisconsin, I have been retired from the chemical engineering faculty, but am occasionally called on for an address to some group on corrosion or electroplating, my specialties. I am the Watts of the nickel plating solution so generally used throughout the U. S. On my retirement from the engineering faculty, I was allowed the use of my old research laboratory and all the research facilities of the Engineering College, and am continuing experimental work on electroplating in the hope of again finding something useful in electroplating.

O. P. WATTS.
Madison, Wis.

• Two dimes will just pay the cost of the reprint, copy of which has been mailed.—Ed.

HARDNESS CHART

Sir:

A number of years ago I saw published in your magazine a graph which instantly converted, for example, a Rockwell A hardness reading into the B, C, and possibly D scales, and Brinell, Scleroscope, and Tensile readings.

If this data is available in published form, I should greatly appreciate your forwarding six copies to me.

ARTHUR C. BUTERBAUGH,
Sharon Steel Corp.,
Chicago.

• The hardness numeral conversion chart appeared in the April 18, 1935, issue of The Iron Age, as a part of an article by John H. Hruska. The demand for it was so heavy that it was reprinted on cardboard. Copies are available at 10c.—Ed.

ADIRONDACK ORES

Sir:

Will you please send us a copy of THE IRON AGE issue of March 5, or if this isn't available we are interested in having a copy of the article, "Titaniferous Adirondack Ores Being Reworked", by Frank J. Oliver, Technical Editor.

M. F. BENTTENMULLER,
Maguire, Inc.,
Philadelphia.

SHIP WELDING

Sir:

We would be glad if you could send us extra clippings of the following articles: Jan. 15, 1942—"Plate Cutting in Ship Construction," by F. G. Outcalt and J. M. Keir; Jan. 22, 1942—"Automatic Arc Welding In Ship Construction," by F. G. Outcalt and J. M. Keir.

R. E. DORE,
The British Oxygen Co., Ltd.
London, England

Sir:

I am interested in obtaining particulars of any recent advances made in the welding of ships and should be greatly obliged if you would send me recent issues of your journal which show novel features or new developments in technique.

C. G. RAMSAY,
Associated Electrical Industries, Ltd.,
Schenectady.

• Another article outlining welding equipment widely used in shipyards appeared in the issue of Aug. 14, 1941, on page 52.—Ed.

FAITHFUL READER

Sir:

I should like to know if it would be possible for me to obtain a few of the back issues of THE IRON AGE?

In ordinary circumstances this publication would be available to me, generally through the subscription entered by the firms with whom I have been employed. Due to my temporary, but unfortunate position, I am, of course, prohibited from obtaining these copies other than from the publisher direct. As a consistent reader of this, it being directly applicable to my work, it is quite natural that I regard the loss of it as one of considerable importance.

670-45-10 Attica Prison,
Attica, N. Y.

• Copies of recent issues have been mailed.—Ed.

WETTING AGENT

Sir:

In an article in your Jan. 15 issue, page 48—"New Miller Speeds Plane Production"—reference is made to the coolant used; this appears to be a grinding compound "with a wetting agent added, to let the oil penetrate to the chip fracture."

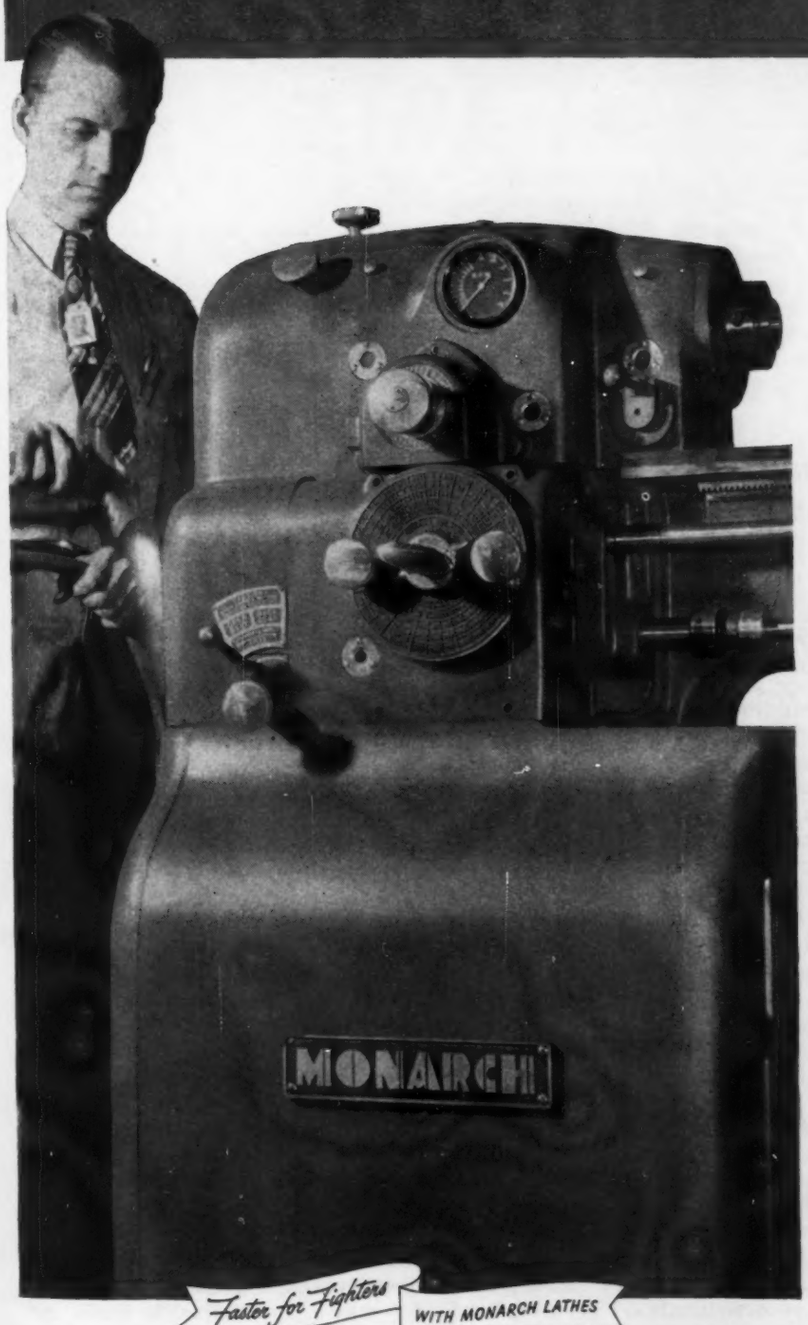
We would be interested to know more about the nature and use of such a wetting agent. I understand that similar materials are used in the dye industry, but I did not know they were used in coolants; and, of course, we would not want to put anything into our soluble oils which would harm the hands of the workers.

Can you, without too much trouble, give us the name of the people who distribute this wetting agent, so that we can write to them for information on this subject?

GORDON LEE,
Works Department,
Sperry Products, Inc.

• This is a rather new development. These compounds were originally formulated for use with quenching oils in order to reduce surface tension effect. Wetting agents have recently been developed that are effective when mixed, in small percentages, with mineral oils. Their addition effects a rapid wetting out of all types of metal surfaces, either hot or cold. A wetting agent employed with soluble oils in grinding is said to improve surface finish. Several oil companies are now using wetting agents in their cutting compounds. Among the pioneers in this field is E. F. Houghton & Co., 240 W. Somerset St., Philadelphia, to which we suggest you write for fur-their details.—Ed.

WE'VE PUT ON "War Paint"



Faster for Fighters WITH MONARCH LATHES

INDIAN WAR PAINT in brilliant colors gives way to today's program of stripping all nonessentials from our War effort. Complying with instructions from the War Production Board, Monarch and other machine tool builders are eliminating everything except protective painting, to save materials, man-hours and to quicken deliveries.

But under this changed surface, Monarch lathes perform just as efficiently as always. They are up in the front lines of our production effort, taking the burden of continuous operation in many plants—helping to deliver the implements of Victory, *faster for fighters.*

We promise you that when Victory is won and restrictions are lifted, we'll again make your Monarch lathes as handsome in their peacetime appearance as they will be useful in their peacetime performance.

THE MONARCH MACHINE TOOL COMPANY

SIDNEY · · · OHIO

MONARCH LATHES

COVER THE TURNING FIELD

This Industrial Week . .

• • •

TODAY the United States is striving to capitalize fully on the unexpected swiftness with which the metalworking industry has been converted to war goods production.

Because of the demands being made upon it, some for speedups, some for slowdowns as the United Nations fighting strategy changes to meet new situations, U. S. industry can conclude that 1942 is to be a year of knockout blows against the Axis nations.

Aircraft production, on which the heralded invasion of Nazi Europe must be based, is constantly rising. Large U. S. bombers of a type which can reach the most easterly plants of Nazi Germany are, THE IRON AGE is told, running 70 per cent ahead of schedule. Automotive plants are producing more aircraft parts, in some instances, than the aircraft industry can now absorb for final assembly. Two such parts plants have reduced their operating rates because of this temporary overflow of parts. It appears that some Detroit plants will shortly be ready for additional war contracts, although the saturation point for such orders in that area had been considered reached. A Toronto plant is retooling to produce four-motored bombers.

Production Over Capacity

In the steel, automotive-aircraft and shipbuilding industries, and in machine tool and other plants, production frequently is exceeding rated capacities, which throws out calculations of war agencies on output and is forcing some drastic changes in plans for completing the nation's industrial war machine.

This hidden "over-capacity" of U. S. plants dovetails into United Nation strategy for a tremendous effort to shorten the war. At the same time it sharpens the need for improvement in the distribution of tanks, planes (certain types), ships and guns from American plants to battle areas. Public discussion of U. S. shipping difficulties on sea and land might speed the war effort. The rain of public criticism under which war output has expanded in the U. S. might also prove useful if applied to the distribution of war products, a matter which is, of course, out of the hands of industry.

Policy on Construction

Evidence of the great pressure for all-out war implement production this year comes, for example, in the WPB statement of policy on new plant construction. This agency said: "The policy means simply that in the light of existing shortages, it is necessary to put materials and effort into planes, ships, tanks and guns now, rather than putting them into plants which would not produce fighting weapons until a much later date."

Effects of the decision to restrict new plant construction will be drastic in steel where perhaps half of the blast furnaces planned four months ago may not be constructed. A large Eastern plate mill may not be built. Many expansion projects in the conversation stage in the steel and other industries will not see the light of day and other projects under way may be altered. WPB officials evidently have concluded that more is to be gained by keeping existing steel facilities at top speed than by diverting material and managerial time to new plants. The need for some plant expansions will be eliminated in many cases through subcontracting, or the rearrangement of existing facilities. Sizable cancellation of structural steel orders during the next few weeks will be one of the results of the chain of recent events in the growth of America's great arms industry. Another possible result —more structural steel fabricators are considering taking parts contracts for pre-fabricated ships.

For the time being, at least, the situation is growing more hopeful for small metal product plants. In the Chicago area, particularly, a large number of such plants is finally getting into war production.

The return to emphasis on subcontracting, which has had other temporary periods of popularity, comes at the beginning of a blackout for many small plants. After midnight June 19, manufacturers cannot fabricate or process a long list of metal products; after Aug. 3 they cannot assemble these items, listed in General Conservation Order M-126.

Meanwhile details of the allocation classification system, perhaps the most drastic revision in the priority setup from its beginning are being explained to industry. To companies which have learned some of the rules of operation under the priority regulations, the new system presents some complications. To operate under it a period of study will be required, although it has been described as "simple."

Applications under the Production Requirements Plan for the fourth quarter of 1942 must identify the end use of materials for which application is made by means of the allocation classifica-

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)

	Pitts-burgh	Chi-cago	Youngs-town	Phila-delphia	Cleve-land	Buf-falo	Wheel-ing	South	De-troit	S.Ohio River	West	St. Louis	East	Aggre-gate
Week of June 2...	99.0	104.5	100.0	85.0	97.5	104.5	83.0	98.0	97.5	105.0	97.0	111.0	105.0	98.0
Week of May 26...	98.0	107.0	100.0	75.0	97.0	104.5	83.0	98.0	101.5	105.0	97.0	111.0	103.0	97.0

NEW ORDNANCE CHIEF takes industrial advisers: Maj. Gen. Levin H. Campbell, Jr., new U. S. chief of ordnance, as one of his first official steps appointed Bernard M. Baruch and three top industrialists as production advisers. From left to right are Benjamin F. Fairless, president, U. S. Steel Corp.; K. T. Keller, president, Chrysler Corp.; Gen. Campbell, and Lewis H. Brown, president, Johns-Manville Corp. Mr. Baruch, War Industries Board chairman in the First World War, was not at this first meeting of Maj. Gen. Campbell's staff.

tion. The classification in conjunction with PRP—sometimes known as "Purp"—is expected to reduce the number of preference ratings.

"Call it an allocation or rationing system, if you will," one WPB spokesman said, "But PRP and the allocation classification should put an end to priorities inflation caused by a lack of centralized control of material distribution."

The new allocation classifications to be used on purchase orders and reports to WPB will supersede a variety of use classifications now required under some priority orders. The PD forms will be reduced in number.

Symbols of the classification (see the latest IRON AGE Priorities Guide, sixth edition, out this week) must be used on all orders placed by manufacturers, fabricators, primary producers, etc., after June 30 and on all such orders which call for deliveries after July 31, regardless of when the orders are placed.

Like all priority orders, the new regulations set up by WPB are intended to get the right materials and equipment to the right plant at the right time. They provide striking evidence of the tightening control over industry necessary to win a modern war.

During the last few days it has become evident that the substantial step-up in lend-lease steel requirements for the third quarter is so sharp that domestic steel rolling schedules will be greatly affected. Efforts to turn out a very large tonnage of steel for export before June 15 have already forced many steel mills to rearrange schedules and have pushed back deliveries on some highly rated tonnage. If present and anticipated demands for lend-lease requirements are met, and if Army, Navy and Maritime Commission requirements are filled, as they will be, some highly essential civilian needs and some less essential military needs are likely to be sacrificed. Here again the objective is a "short" war. If the war turns out to be long, greater attention will be given the release of steel for essential maintenance and repair programs.

Steel specifications in May in most cases fell short of the volume placed in April but nevertheless exceeded production so that backlogs changed little. One steel company reports that backlogs average six months' business.

Most mills have established quotations for the National Emergency nickel alloy steel series, and orders have been placed for these steels. Some mills have returned orders calling for old alloy analysis and have asked for new orders if the new alloys are acceptable. Since not all NE steels have been widely tested in actual use under various stresses, steel consumers are reported to be concerned over their ability to use this material in high stress industrial equipment. Consumers over-specifying in the past are expected to find the new alloys satisfactory.

Steel ingot production this week is up a point to 98 per cent, from 97 per cent last week, according to estimates by THE IRON AGE. With the exception of a 10-point advance to 85 per cent in Eastern Pennsylvania, due to plant recovery from high water damage, few steel-making districts report changes in operations. Pittsburgh, however, is up a point to 99 per cent, Cleveland a half point higher at 97.5 per cent, and the Eastern area two points higher at 105 per cent. A decline of two and a half points to 104.5 per cent at Chicago is attributed to shutdown for repairs. Detroit production is four points lower at 97.5 per cent. Districts reporting unchanged schedules are Youngstown at 100 per cent, Buffalo at 104.5 per cent, Wheeling-Weirton at 83 per cent, Southern Ohio River at 105 per cent, Western district at 97 per cent and St. Louis at 111 per cent.

"When the customer says: 'A REMARKABLE JOB'—that's important!"

★ Thin framework sections in a piece of equipment represent just about as tough a stainless casting assignment as you'll find. But the thin sections and overall weight of the job pictured above were held to the precise limits required—one more evidence of the close control, the uniformity of analysis and density of structure, that our special "hollow-electrode" melting furnaces make possible. These are important qualities.

You'll find Allegheny Stainless Castings easier to machine and weld. Production is speeded up, spoilage reduced. In many cases stainless castings can replace forgings, thus further reducing machining time and waste.

Our technical staff is ready to give you effective help, regardless of the type or size of stainless part you may require. Meanwhile, mail the coupon below for further data on Allegheny Stainless Castings.

ALLEGHENY LUDLUM
STEEL CORPORATION PITTSBURGH, PA.
Branch Offices in AL *Principal Cities*

Allegheny Ludlum Steel Corporation S-231
Oliver Building, Pittsburgh, Pa.
Send me your Stainless Castings Bulletin.

Name.....
Company.....
Address.....

News of Industry

GIRDLER ON A BOMBER: Tom M. Girdler, chairman of Vultee Aircraft, Inc. (and of Republic Steel Corp.) is shown (left) on the wing of a completed Vultee Vengeance dive bomber as Robert McCullough, a Vultee general manager, points out the plane's engineering features.

6 Blast Furnaces In Expansion Plan May Be Dropped

Pittsburgh

• • • **The War Production Board,** it has been learned, has finally approved a definite schedule of suspensions on steel mill expansion programs. Complete details had not been disclosed early this week and speculation was still rife as to which projects had been abandoned.

It is known that on many of the projects which will be completed, the WPB will, in order to expedite construction, assign a higher rating than A-1-k, the preference symbol which had previously been assigned to such work. In view of the difficulty in obtaining steel for the time being on anything but orders bearing allocations or A-1-A and A-1-B, it is expected that the balance of the projects which have not been abandoned will "take their chance" on getting built with an A-1-k rating or lower.

It is believed that 7 or 8 blast furnace projects out of the total of 26 have been definitely abandoned and the construction work on some of those left will be expedited considerably. It is also reported that a large eastern steel plant and plate mill which had been in the original expansion program is to be abandoned also.

More recent expansion projects will probably "never see the light of day" and many of the projects now under way may be changed before final completion. It can definitely be said that the original 10,000,000 ton steel ingot expansion program will not be completely realized. There is a good possibility that not more than 8,000,000 tons of this major project, if that much, will be completed. There is expected to be rearrangement in the plans as approved which might possibly affect electric steel capacity projects.

War Department Authorizes Work on Five Projects

• • • **The War Department** announced May 27:

Authorization for the construction of a depot warehouse in Indiana, to cost in excess of $3,000,000. Construction will be supervised by the Louisville district office of the Corps of Engineers.

Authorization for the construction of an air force training school at Independence, Kans., to cost approximately $3,000,000. Construction will be supervised by the Tulsa district office of the Corps of Engineers.

Award of a contract to the Weitz Co., Inc., Des Moines, and the Fox Valley Construction Co., Appleton, Wis., for construction management service for a manufacturing plant in Wisconsin.

Award of a contract, on a competitive bid basis, to Granis-Higgins-Thompson and McDevitt of Charlotte, N. C., for construction of an air force training school at Goldsboro, N. C.

Award of a contract to Huber and Knapik, San Francisco, for architectural-engineering service, for construction of a general hospital at Modesto, Cal.

Nordberg Wins Navy "E"

Milwaukee

• • • **Nordberg Mfg. Co.** was awarded a Navy "E" for production, on May 15 before an audience of more than 5000 Nordberg employees, their guests, and company guests. Ensign Carl F. Zeidler, mayor of Milwaukee on leave of absence, attended the ceremonies.

Did You Get Your New Priorities Guide?

• • • This issue of THE IRON AGE, section two, contains the latest summary of government priority orders and forms, instructions on how to operate under the Production Requirements Plan and other information on wartime controls vital to industry.

If your copy of THE IRON AGE does not contain this Guide, a reader receiving the magazine before you may have taken the Guide for his own use. If you cannot persuade him to give up the Priorities Guide (all subscribers are entitled to one free copy) you may obtain additional copies by wiring or writing THE IRON AGE, 100 East 42nd Street, New York City. Prices are: one to 10 copies, 50c. each; 11 to 100 copies, 40c. each; 101 to 300 copies, 35c. each and 300 or more copies, 30c. each.

Allocation of Materials Now the Bottleneck

Newark, N. J.

• • • **The record breaking job** of providing war production facilities has either been completed or is well under way and the dispersion or allocation of materials to the various producers is now the paramount problem facing the War Production Board, according to W. H. Harrison, director of production. In three or four months, the material problem will probably be under control and the emphasis will be shifted to balancing manpower, Mr. Harrison said in an address made before a regional war production conference held here on May 29. The meeting was sponsored by local chapters of 15 engineering societies in the New York area. Close to 1000 engineers and production executives attended.

This was one of many similar conferences held throughout the country in recent weeks for the purpose of pooling information by people making the same defense items. Mr. Harrison said that the next step will be the formation of discussion groups in each community for the purpose of preventing waste of materials and to make the most effective use of machinery and manpower. "We need to conserve and make the best use of every metal we have," the speaker said.

Himself an engineer, Mr. Harrison paid tribute to the engineers present, citing their unselfish devotion to their jobs and to the cause both individually and as groups.

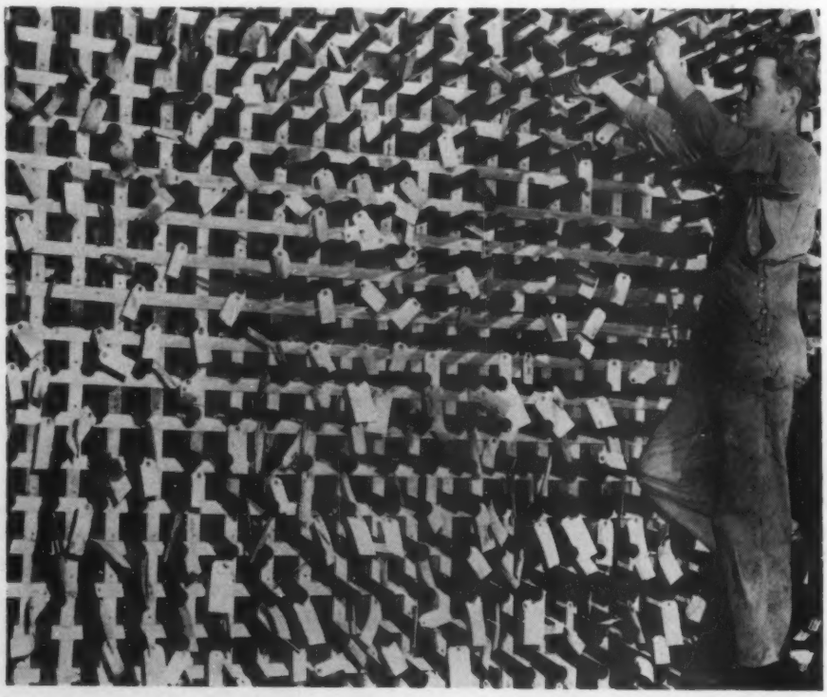
Following the dinner session there were individual panel discussions on substitute materials, ordnance inspection and on machine shop, metallurgical, electrical, welding and foundry problems. In the afternoon, there was a general meeting devoted to the broad problems of plant conversion, ordnance manufacture, aircraft manufacture and the making of naval equipment.

Foundry Being Expanded

Cincinnati

• • • **Permit to build** an addition to its present foundry was granted to the Cincinnati Milling Machine Co. last week. The new building will be 107 by 230 ft. and will be built of reinforced concrete and glass block to save structural steel and steel sash.

ANTI-AIRCRAFT CANNON BARRELS: Finished barrels for the automatic anti-aircraft cannon produced in quantity by Pontiac motor division of General Motors are shown here in a section of a barrel rack. Spare barrels go with each of these hard-hitting guns.



Data on NE Steels Available From Steel Institute

New York

• • • **A limited amount of data** on the hardenability characteristics and the physical properties of National Emergency 8000 series steels have been made available in the form of 58 loose leaf sheets published by the American Iron and Steel Institute. End-quench hardenability tests have been made on single heats of most of the NE-8000 series low alloy steels. Data on tensile strength, elastic limit, reduction in area and Izod impact values are available on certain sizes of bar stock for various draw temperatures. A few tests have also been made on rectangular forging billets. The complete bulletin is designated as Section 10, Alloy Steels, dated May 18.

As more information accumulates, it will be released from time to time through the institute and the War Production Board in Washington. These NE steels are made in accordance with new specifications designed to conserve scarce alloying elements like nickel and chromium. Tables covering the chemical analyses were published in THE IRON AGE, April 9. Reprints are available.

Metal Processing Patents of Axis Are Seized by U. S.

• • • **Leo T. Crowley,** alien property custodian, on May 28 announced that he had seized 80 Japanese owned patents and two owned by Germans. A small block of Italian owned bonds was also taken over by the custodian.

The seized patents include many in the mechanical and electrical fields and several relating to the processing of steel, aluminum, and other metals.

No Relaxation on Metal Furniture, Says Adams

Washington

• • • **W. A. Adams,** chief of WPB's furniture and bedding branch, announced that May 31 would be the last day for the production of certain types of metal office furniture and equipment. Reports forecasting a relaxation of the order had come to the attention of the branch, Mr. Adams said, but no amendment is contemplated.

3 REASONS for FASTER QUENCHING SPEED PLUS STABILITY

1. HOUGHTO-QUENCH "G" is an oil made solely for quenching; its make-up includes a percentage of wetting-out agent to speed spreading over metal surfaces.
2. HOUGHTO-QUENCH "G" embodies a further ingredient high in heat absorption, enabling transfer of heat more rapidly from the metal.
3. HOUGHTO-QUENCH "G" contains a patented stabilizing agent which minimizes oxidation or fractional distillation of the oil in service.

You want fast quenching speed—and you get it with Houghto-Quench "G." But that's not all: you also get a lasting power, a stability that keeps Houghto-Quench "G" the same, month after month. You get freedom from sludging; no clogging of cooling systems. You get the proper fire, flash and viscosity. And finally, you get the services of men trained in heat treating who can help you greatly in the many new problems you face today.

For those reasons, insist on HOUGHTO-QUENCH "G" for quenching munitions and war materials.

Products for War Manufacturing
Carburizers
Blackening Salts
Drawing Compounds
Rust Preventives
Specialized Lubricants
Heat Treating Salts
Metal Cleaners
Pickling Inhibitors
Core Oils
Hydraulic Oils

E. F. HOUGHTON & CO.
PHILADELPHIA
Chicago - San Francisco - Detroit

HOUGHTO-QUENCH "G"

MURCHEY TYPE "M" COLLAPSIBLE MACHINE TAP
Just one purpose . . . good threads . . . but many
Murchey Threading Tools are available to help
you achieve that purpose in the best way. Write
Murchey about your threading problem.
Murchey
MACHINE & TOOL CO.
Detroit, Michigan
MURCHEY TYPE "G"
(NON-ROTATING)
SELF-OPENING DIE HEAD

Canada Shifts Three War Supply Department Officials

Ottawa

• • • **C. D. Howe,** head of the Department of Munitions and Supply, has announced the appointment of R. C. Berkinshaw, chairman of the Wartime Industries Control Board, to the post of Assistant Deputy Minister in charge of Industrial Controls; J. P. Pettigrew, former chief assistant to G. K. Sheils, deputy minister, to assistant deputy minister in charge of organization and financial controls; and F. H. Brown, former director general, Munitions Contract Branch, to assistant deputy minister in charge of procurement.

↓ ↓

Technical Steel Group Named

Ottawa

• • • **A technical advisory** committee on alloy and special steels for Canada has been appointed by the Department of Munitions and Supply. Members are: J. G. Morrow, chief metallurgist of the Steel Co. of Canada, Ltd., and technical adviser to the steel controller, chairman; Major-General A. E. Macrae, military technical adviser to the department; T. Hardy, metallurgist for Atlas Steels, Ltd., Welland; F. A. Looseley, works manager of Dominion Foundries & Steel, Ltd., Hamilton; H. Biers, adviser to the metals controller, Ottawa; and Brigadier G. B. Howard, deputy inspector general of the Inspection Board of the United Kingdom and Canada.

Ore Shipments on Lakes Break All Records in May

Cleveland

• • • **Total iron ore** shipments down the Great Lakes during May broke all-time monthly records at 12,677,356 gross tons, according to the Lake Superior Iron Ore Association. This compares with the 11,081,199 gross tons shipped during the similar month of 1941. This highly satisfactory month brought this year's iron ore movement up to June 1 to a total of 21,327,064 gross tons which represents a gain of 3,291,072 gross tons over the 18,035,992 gross tons that had been moved up to June 1, 1941.

Steel Employees at New Peak in April

• • • The number of employees in the steel industry rose to a new peak of 654,000 in April, according to the American Iron & Steel Institute. The April total was 1,000 more than the previous peak of 653,000 employed in March and was also well ahead of April, 1941, when 621,000 were employed in the industry.

Steel payrolls also increased sharply during April to $118,568,000, exceeding the March total of $116,998,000 despite the fact that April had one less working day. In April a year ago, payrolls in the steel industry totaled $108,557,000.

Wage-earning employees of the industry earned an average of 100.4 cents per hour in April, as against 100.1 cents per hour in March and 97.4 cents per hour in April, 1941. Wage earners worked 39.7 hours per week in April, compared with 38.1 hours per week in March and 39.4 in April last year.

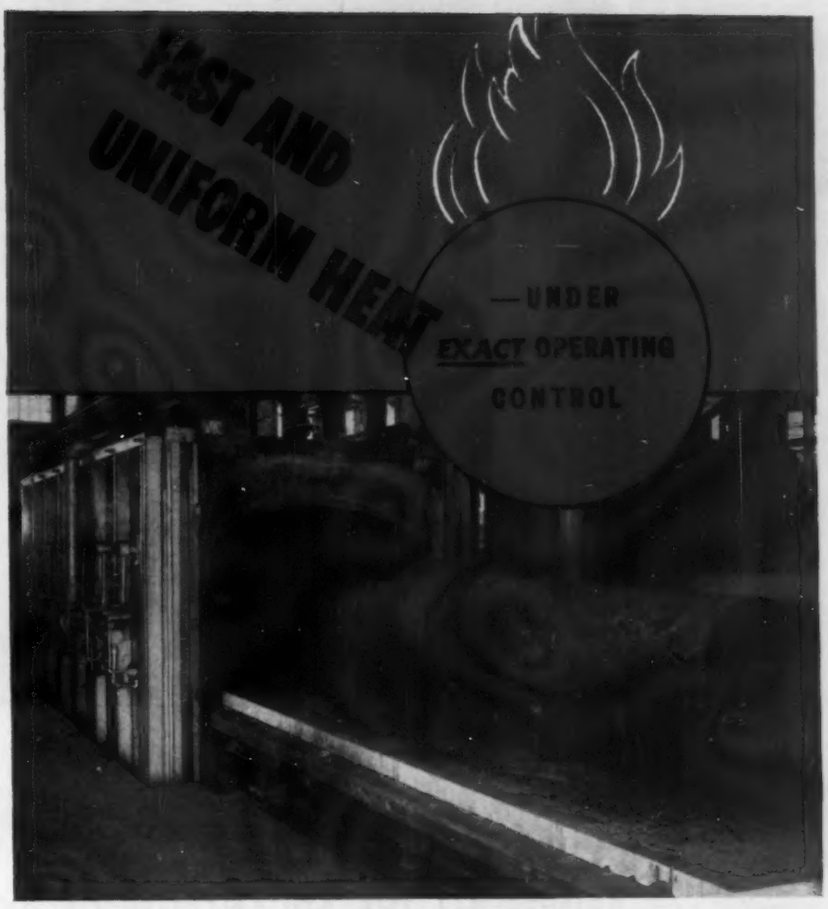
Airplane Seen Transforming Travel and Freight Movement

Chicago

• • • **The development** of aircraft under the demands of the war has reached the point where travel and freight movement after the war will be revolutionized, Eugene E. Wilson, president of United Aircraft Corp., told a meeting of the Union League Club here last week.

The airplane can be as revolutionary after this war as the railway was following the Civil War and the automobile after the first World War, Wilson explained. Revolutionary developments in the aircraft field are under way, he said, citing the helicopter as a suggestion of what the future holds.

The airplane, he said, which has shown itself able to compete successfully with railway and highway transportation, comes into its own over new terrain. The airplane is really an economical form of transportation, considering the cost of such surface rights as railways, highways and waterways, Wilson explained.



Delivered day in and day out by

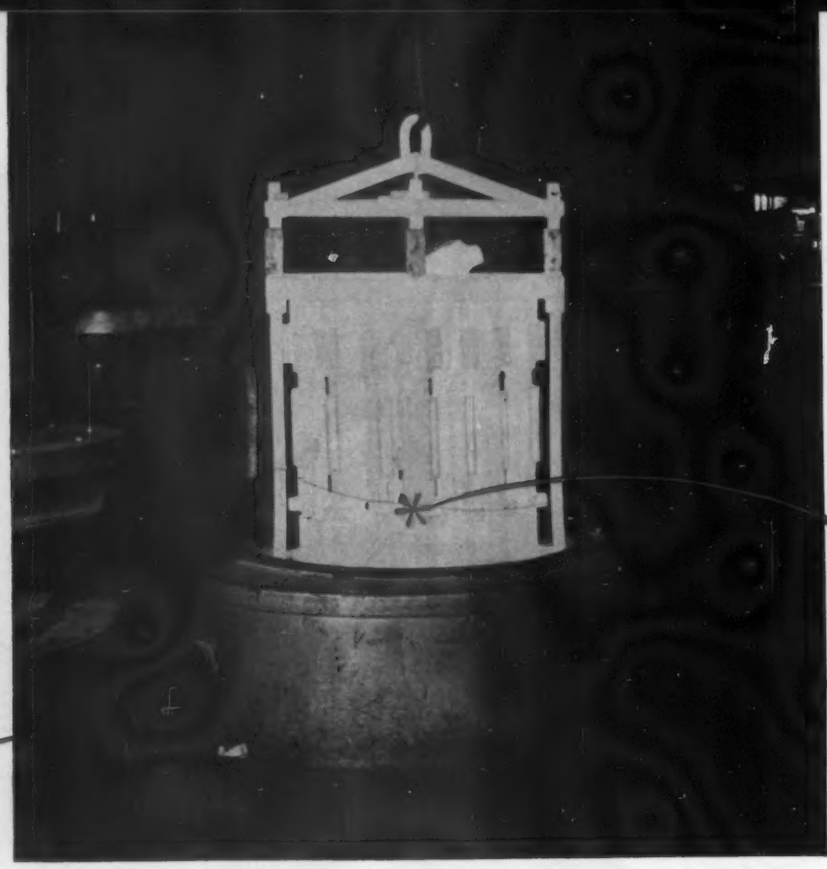
SWINDELL

HIGH TEMPERATURE CAR-TYPE FURNACES

—on scores of war production assignments where performance *must* be right!

LET US CONSULT ON YOUR PRESENT FURNACE PROBLEMS

SWINDELL-DRESSLER Corporation
DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES
PITTSBURGH, PA.



* NEW HEATING PRINCIPLE

BRINGS ALL THE ADVANTAGES OF 100% FORCED CONVECTION HEATING IN THE ANNEALING, NORMALIZING, AND HARDENING RANGES

THE 250° F. to 1750° F. temperature range of the Super-Cyclone, with the heating and control accuracy within that range, combines a hardening, normalizing, annealing, tempering, and nitriding furnace into one.

A typical example of the furnace's versatility is the normalizing job shown in the above illustration. These forgings are SAE 3450 and weigh 126 pounds each. The heating cycle starts with 12 of these forgings (1512 lbs.) loaded on a fixture, heated to 1650° F. in the Super-Cyclone, removed, and air cooled to 400° F. On the same fixture, they are charged into the Super-Cyclone again and heated to 1500° F., held 1 hour at this temperature and then oil quenched to 400° F. The charge is then put back into the same Super-Cyclone for tempering at 1100° F. and held for 4 hours. The entire operation is done in the one Super-Cyclone without handling the forgings, once they are placed on the fixture.

The previous method of handling was to heat these forgings in a radiation type box furnace. The capacity of the box furnace was 5 pieces. Time to heat them to 1650° F. required 5 hours, which included 1 hour for soaking at that temperature.

Normalizing in the Super-Cyclone, 12 forgings are heated in 2½ hours, including the soaking time of 1 hour at 1650° F. This is a production increase nearly 5 times greater than the old method of heating.

The forgings from the box furnace required straightening after the heating operation, whereas the 100% forced convection heating principle of the Super-Cyclone in minimizing distortion, produces straighter work, thus eliminating extra handling time for straightening as previously required.

With the box furnace, 2 men were required to handle the forgings individually in loading and unloading the furnace. In the Super-Cyclone, once the fixture is loaded, one man can handle the 12 forgings through the entire heating operation.

This Super-Cyclone normalizing, hardening, and tempering job is typical of the furnace's flexibility and the savings available through greater production, reduced handling time, and straighter work.

SUPER-CYCLONE QUENCHING

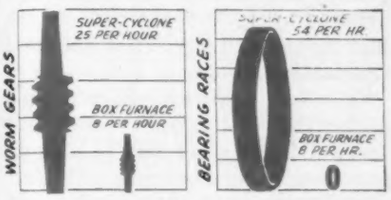
When the first Super-Cyclone was being designed, Lindberg Engineers anticipated the obvious problem of mass quenching of heavy loads and devised equipment to take care of the situation. A typical example is the 1512 lb. load of forgings shown in the illustration above, which is heated and quenched, fixture and all. Jobs similar to this are being quenched with perfect results, every day, in plants all over the country.

Heat treaters who have seen the Super-Cyclone in action, quickly appreciate that to secure all the advantages of which the furnace is capable, the quench must be looked at from an entirely new standpoint. This involves quench tank size, oil velocity, volume of oil, cooling, and storage.

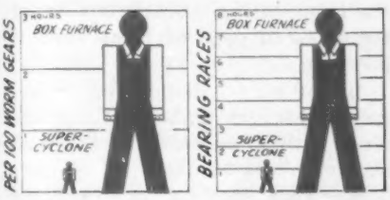
Twenty-one months of production experience in our own plant and in the field, with nearly 200 installations, have enabled Lindberg Engineers to work out an accurate formula which greatly simplifies this problem.

LINDBERG FURNACES

SUPER-CYCLONE INCREASES PRODUCTION because work is stacked up or piled up on a fixture, rather than laid out in one layer as in conventional equipment. The 100% forced convection heating principle of the Super-Cyclone then brings the work to temperature rapidly, accurately, and uniformly. The charts below show Super-Cyclone production increases over radiation type box furnaces which were previously used on these bearing race and worm gear jobs.



SUPER-CYCLONE REDUCES HANDLING TIME. With a temperature range from 250° F. to 1750° F. and accurate control therein, the Super-Cyclone is a flexible unit for any heating operations within that range. The forgings on the opposite page are normalized, hardened, and drawn, in the same Super-Cyclone, on the same fixture, effecting a substantial reduction in handling time. The charts below, represent a handling time comparison between the Super-Cyclone and the radiation type box furnaces that were previously used on these bearing race and worm gear jobs.



SUPER-CYCLONE KEEPS WORK STRAIGHTER. The 100% forced convection heating principle prevents distortion by eliminating any possibility of radiant heat striking the charge. Heated air is driven through the charge at high velocity, resulting in a rapid, uniform, and accurate heat. With distortion reduced to a minimum, valuable man hours are freed from the straightening press for use on other work. It might be noted that the above chart does not include an additional 7½ hours handling time for straightening the 100 worm gears from the box furnace.

IMPORTANT NOTE: Like all other Lindberg developments, the Super-Cyclone has been thoroughly proved under 24 hour a day production conditions for a minimum of 12 months before announcement to the trade. To date, nearly 200 Super-Cyclones are in service from coast to coast. One or more of these installations is near you, as is a Lindberg District Office, staffed by practical and competent sales engineers. The Super-Cyclone is *not* a cure-all, nor do we represent it as such, however, it is speeding production, turning out straighter work, and cutting costs for many firms. We will be glad to survey its possibilities for you, on your work, at your request.

CYCLONE FOR TEMPERING

Here is the production proved tempering furnace that can help you meet today's toughest production schedules. Thousands of Cyclones are now employed all over the country for low cost, accurate tempering, annealing, and stress relieving. The Cyclone, with a temperature range of 250° F. to 1250° F., increases production, reduces rejections through accurate heating control, and cuts operating costs.

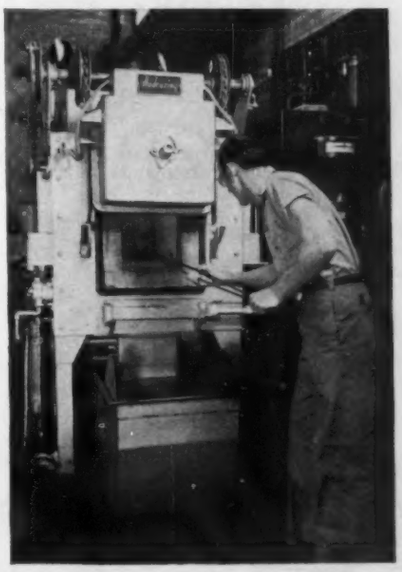
Employing the 100% forced convection heating principle, the Cyclone increases production by heating the charge rapidly and uniformly. The work is soaked in heated air that is recirculated through the charge under pressure. The Lindberg Throttling Control adjusts the input of heat to meet the requirements of the load, thus assuring accurate temperature control, hardness tolerances of plus or minus 1 Rockwell "C", and reduction of operating costs.

Lindberg Cyclone Tempering Furnaces are available in a wide range of standard sizes of the vertical or box type, electric or gas fired. For more specific information may we suggest you write for bulletin Number 53—Gas Fired Vertical, Number 13—Electric Vertical, and Number 62—Electric Box Type, or phone your local Lindberg representative, who will be glad to demonstrate the advantages of this low cost, accurate tempering furnace.

Whether the charge be a dense load of bolts, as shown above, or large pieces of heavy section, the Cyclone Tempering Furnace's 100% forced convection heating principle heats them rapidly and accurately, holding them to extremely close hardness tolerances.

HYDRYZING FOR HARDENING

NO SCALE
NO DECARB
NO CARBURIZATION



Maximum production runs of punches, dies, and other tools can be obtained with the scale-free, decarb-free, and carburization-free hardening of Hydryzing. The neutral, controlled atmosphere of the Hydryzing Furnace is fool-proof, and easy to regulate to meet the needs of all types of steel. It turns out work that is clean and hard, right on the surface, thus eliminating the need for costly grinding, stoning, or polishing.

The products necessary to produce the neutral Hydryzing atmosphere, charcoal, anhydrous ammonia, and benzol are readily procurable in any locality, thus forestalling any production delays due to the need for special equipment.

The standard Hydryzing Furnace is built in a wide range of sizes from heavy production types to tool room furnaces. It is also made in Rotary Drum, Rotary Hearth, Tilting Hearth for bright hardening, and Conveyor types, to meet the requirements of various jobs.

More detailed information may be obtained on these controlled atmosphere furnaces by asking for bulletin Number 94.

Visible on the Hydryzing Furnace in the photo at left is the outside door curtain, the special replaceable door sealing gasket, the vestibule protection plate, and in the lower left hand corner, the foot pedal which controls the automatically operated door. The advantage of the outside door curtain, which is placed immediately below the chamber opening, is its greater transparency and ease of access for cleaning and maintaining.

LINDBERG ENGINEERING COMPANY • 2452 WEST HUBBARD STREET • CHICAGO

SUPER-CYCLONE
HYDRYZING
CYCLONE

FOR ANNEALING, NORMALIZING, HARDENING, TEMPERING, AND NITRIDING

FOR SCALE-FREE AND DECARB-FREE HARDENING

FOR LOW COST ACCURATE TEMPERING

Queries on Order M-126 Answered by WPB

• • • **Since the announcement** on May 5 of WPB General Conservation Order M-126, the office of the administrator, Edward F. Addiss, 122 East 42nd Street, New York, has received hundreds of queries from all parts of the country. Below are some of these questions and the official answers to them.

This iron and steel order is one of the most drastic ever issued by the WPB. It affects some 40,000 plants in the United States. By the order, manufacturers of 400 non-essential items (List A) are now forbidden to receive any raw materials for making the selected items. After midnight of June 19 —manufactures cannot fabricate or process any such material; after Aug. 3, they cannot assemble any of the items listed.

Q.—How may a manufacturer obtain the quota of items that he is allowed to fabricate and assemble in coming weeks before finally stopping production?

A.—He should take the total weight of all metals put into process by him in 1941 and divide this amount by 12—75 per cent of the last figure will give him his total fabricating quota.

Q.—How may inventory frozen under this order be disposed of?

A.—Carbon steel may be sold on purchase orders bearing a Preference Rating of A-10 or higher and alloy steel including stainless may be sold on purchase orders bearing ratings of A-1-K. It should be noted that steel warehouses all have a higher preference rating than A-10—and in many cases are eager to purchase stock. Other provisions for the disposition of inventory are outlined in the order. Possessors of frozen inventory are urged by WPB not to hold their inventory until the expiration of their operating period but to attempt to dispose of it as soon as possible.

Q.—What disposition shall manufacturers make of fully fabricated articles held in inventory at the end of 90 days?

A.—This order is concerned only with the fabrication and assembly of items mentioned on List A and imposes no restrictions on the disposition of finished articles.

Q.—Are painting, lacquering, lithographing, plating, or similar coatings or coverings to an article on List A considered as processing or assembling?

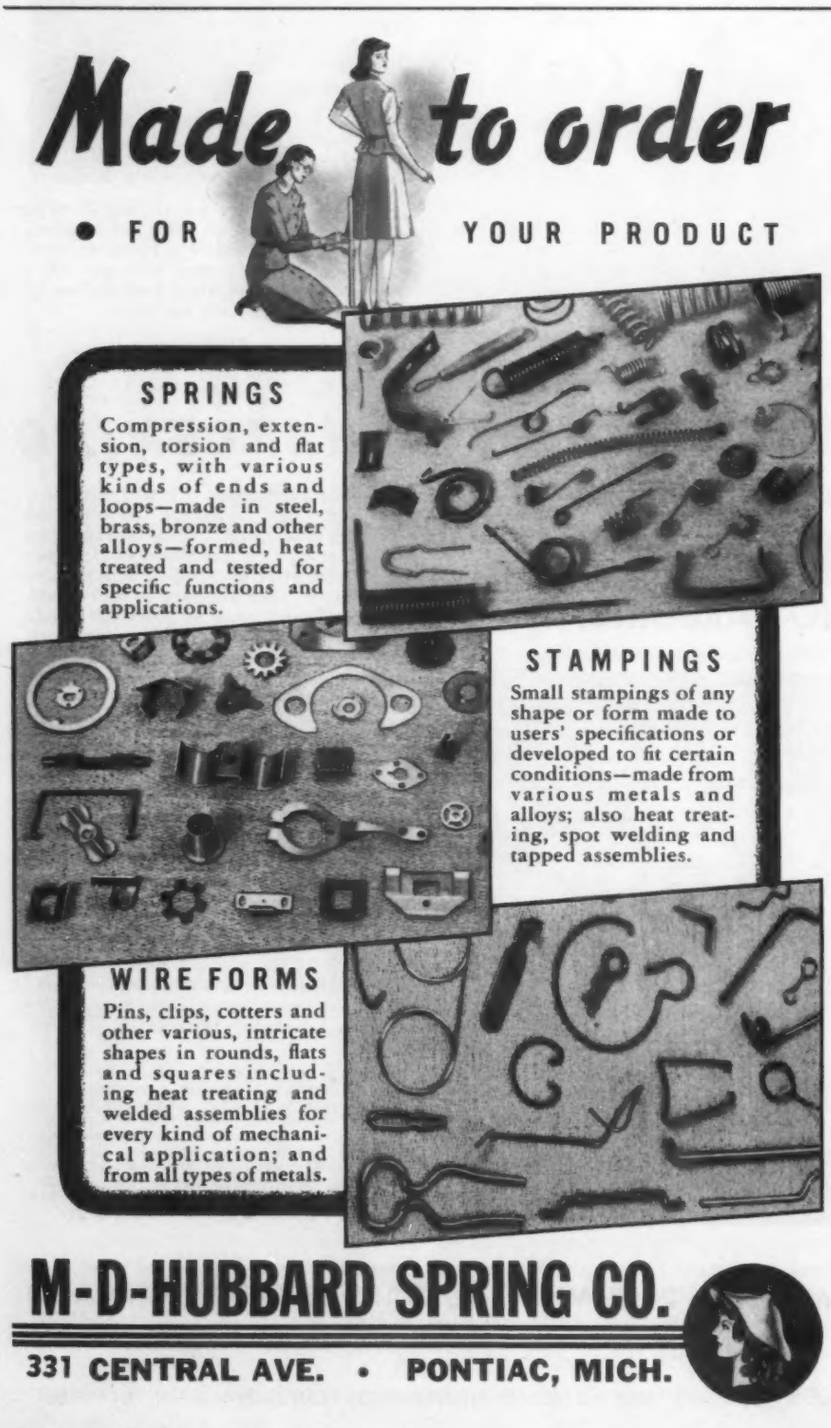
A.—No. In other words a manufacturer may paint or lithograph items on List A after Aug. 3 if he does not do any further processing or assembling of that item.

Q.—If a manufacturer, using non-critical materials for manufacturing items on List A, needs nails, screws or other fastening devices made of iron and steel, may he legally use them?

A.—Yes. Screws, nails, rivets, bolts, wire strapping or similar small hardware for joining or serving a similar essential purpose may still be obtained and used legally in manufacture.

Q.—May a manufacturer whose use of iron and steel has been stopped by M-126 employ other metals as substitutes?

A.—Only gold or silver. The WPB, however, believes that in many instances manufacturers will


Made to order
• FOR YOUR PRODUCT
SPRINGS
Compression, extension, torsion and flat types, with various kinds of ends and loops—made in steel, brass, bronze and other alloys—formed, heat treated and tested for specific functions and applications.
STAMPINGS
Small stampings of any shape or form made to users' specifications or developed to fit certain conditions—made from various metals and alloys; also heat treating, spot welding and tapped assemblies.
WIRE FORMS
Pins, clips, cotters and other various, intricate shapes in rounds, flats and squares including heat treating and welded assemblies for every kind of mechanical application; and from all types of metals.
M-D-HUBBARD SPRING CO.
331 CENTRAL AVE. • PONTIAC, MICH.

Priorities Guide

• • • Your copy of the sixth edition of the Priorities Guide is inclosed as Section Two of this issue of THE IRON AGE. In it are listings of all metal industry priority regulations and forms, price ceilings, and a new section on the Production Requirements Plan with its "Allocation Classification" symbol system.

Prices for additional copies of the Priorities Guide are:

1 to 10 copies, 50c. each
11 to 100 copies, 40c. each
101 to 300 copies, 35c. each
301 or more copies, 30c. each

Wire or mail your order to THE IRON AGE, 100 East 42nd Street, New York. Kindly send stamps or coin with orders amounting to $2 or less.

be able to use wood, paper, glass, or other non-critical materials.

Q.—How does a manufacturer appeal for a relief from the terms of M-126?

A.—He must make his appeal on Form PD-437. This should be obtained from and—when filled out—returned to the district office of WPB nearest the plant manufacturing the product affected by the order. The decision on the appeal will be sent directly from the administrator's office in New York to the appellant.

Q.—What types of appeals will be granted?

A.—Only those where the appellant shows that the order interferes with war work or with his plans to convert to war work. Hardship is not a basis for an appeal.

Q.—What is the difference between Lists A, B, and C?

A.—List A includes those items whose production must be gradually stopped by Aug. 3. List B includes products for the Army, Navy and Maritime Commission that are entirely exempted from the order until Aug. 3. List C—as yet unformulated—will include those items from List B whose manufacture may be continued after Aug. 3. This list will be prepared at the recommendation of the Army and Navy Munitions Boards.

Q.—Is there any one source of information on M-126?

A.—Yes. Edward F. Addiss, Administrator, WPB, General Conservation Order M-126, 122 East 42nd Street, New York City.

Q.—Will the WPB give definitions of what is meant exactly by such general terms in List A as novelties, sporting and athletic goods, photographic accessories, etc.

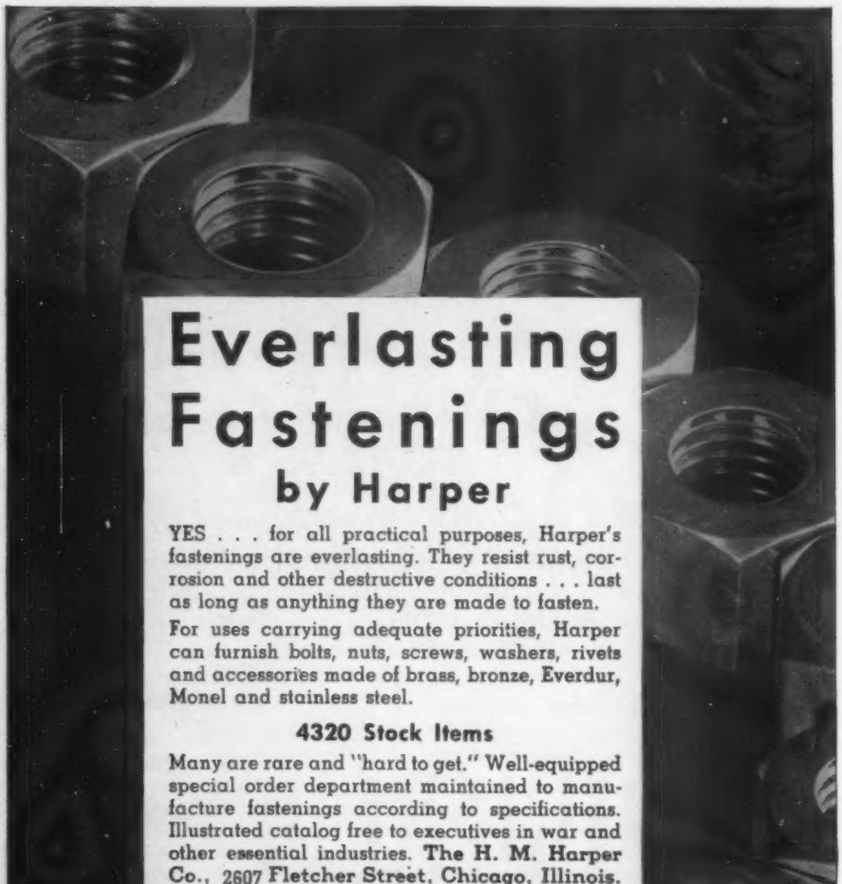
A.—The Administrator's office will be glad to give a decision as to whether any particular object comes under the order. Pictures of the object, leaflets, catalogues, are often of assistance in reaching a decision.

Q.—An object may be affected by other orders in addition to M-126. In such instances, which order is the governing one?

A.—The clause or provision in either order which is the most restrictive one—that is which conserves the most iron and steel for war production—is the governing one.

HOLTITE-Phillips
Recessed Head
SCREWS & BOLTS
are as Time-Saving and Efficient
as a Zipper
Assembling time reduced to 50%
and more . . . spoilage and injuries eliminated! These are
the highly profitable features that have made HOLTITE-Phillips
screws, bolts and allied fastenings the choice of progressive
manufacturers who have adopted faster driving methods to
speed deliveries and cut costs. . . Regular HOLTITE products
and Specials, offer every user an unlimited range of fastenings
that can be profitably used in the assembly of practically every manufactured product.
CONTINENTAL
SCREW COMPANY
New Bedford, Mass. U.S.A. Warehouse at Detroit, Mich.

"E" TO AMERICAN BLOWER: A huge fluid drive unit on test at the Russell Street Plant of the American Blower Corp., Detroit, was inspected by Rear Admiral John Downes, Commandant of the Ninth Naval District, on the occasion of the Navy's presentation to the plant of the Navy "E" Burgee for American Blower's outstanding performance in the production of these fluid drives and other Naval material.


Everlasting
Fastenings
by Harper
YES . . . for all practical purposes, Harper's fastenings are everlasting. They resist rust, corrosion and other destructive conditions . . . last as long as anything they are made to fasten.
For uses carrying adequate priorities, Harper can furnish bolts, nuts, screws, washers, rivets and accessories made of brass, bronze, Everdur, Monel and stainless steel.
4320 Stock Items
Many are rare and "hard to get." Well-equipped special order department maintained to manufacture fastenings according to specifications. Illustrated catalog free to executives in war and other essential industries. The H. M. Harper Co., 2607 Fletcher Street, Chicago, Illinois. Eastern Office, 45 West Broadway, N. Y. C.
HARPER Chicago
EVERLASTING FASTENINGS

Farm Machinery Export Group Among 6 Committees Named

Washington

• • • **The formation** of six industry advisory committees during the week beginning May 25 was announced on Monday by T. Spencer Shore, chief of the Bureau of Industry Advisory Committees.

Among the committees are Farm Machinery and Equipment Export Industry. William R. Tracy, chief of the Farm Machinery and Equipment Branch, is government presiding officer. Committee members are:

H. S. Eastwood, export manager, The De Laval Separator Co., New York; W. F. Haberer, export manager, Deere & Co., Moline, Ill.; A. R. Hauschel, export manager, J. I. Case Co., Racine, Wis.; D. A. Himes, export manager, Oliver Farm Equipment Co., Chicago; G. C. Hoyt, vice-president, International Harvester Co., Chicago; A. G. Jacoby, export sales manager, S. L. Allen & Co., Philadelphia; W. B. Kellogg, export manager, F. E. Myers & Brothers Co., Ashland, Ohio; Roger M. Kyes, vice-president, Ferguson, Sherman Mfg. Co., Dearborn, Mich.; C. M. Lancaster, export manager, B. F. Avery & Sons Co., Louisville, Ky.; W. B. Taylor, export manager, Minneapolis-Moline Power Equipment Co., Minneapolis, Minn.; W. O. Taylor, export manager, Allis-Chalmers Mfg. Co., Milwaukee; Lewis C. Walker, president, Aermotor Co., Chicago.

Refrigerator Valve and Fittings Manufacturers Industry: W. H. Pape, sales manager, Crane Co., Chicago; G. J. Henry, president, Henry Valve Co., Chicago; Charles Benson, Imperial Brass Mfg. Co., Chicago; Edward G. Mueller, president, Kerotest Mfg. Co., Pittsburgh; F. L. Riggin, president, Mueller Brass Co., Fort Huron, Mich.; K. M. Newcum, Superior Valve & Fitting Co., Pittsburgh; E. J. Ferguson, treasurer, Weatherhead Co., Cleveland; and V. L. Graf, president, V. L. Graf Co., Detroit.

Trade Notes

Mahr Mfg. Co. has appointed George D. Anderson, Jr., of the Commonwealth Products Co., 118 North 23rd Street, Birmingham, Ala., its representative in Georgia and Mississippi, southern and central Alabama, northwest Florida.

•

J. Schwartzman Mfg. Co. has moved its offices and plant to 1033-35 North La Brea Avenue, Hollywood, Cal.

•

Cookware Co. of America, Keeler Road, Hartford, Mich., has changed its name to Burnette Castings Co.

•

Deceleco, Inc., Wayne, Mich., has changed its name to Unistrut Corp.

•

Mexican Government Railway System announces that Mr. Francisco Hernandez A. has been named acting material agent, at 120 Wall Street, New York, substituting for Mr. Santiago V. Gonzalez, who has been granted a leave of absence.

•

Lanpher & Schonfarber, Inc., 58 Weybosset Street, Providence, R. I., has changed its name to Gordon Schonfarber & Associates, Inc.

Retooling Curb on Canada Plane Output

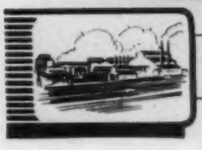
Ottawa

• • • **Replying to** criticisms of the government's war industry program, especially the slowing down in Canada's aircraft plants, C. D. Howe, minister of munitions and supply, went into detail to enlighten members of the House of Commons. Regarding reports from many quarters that the aircraft industry was not producing at near capacity, Mr. Howe replied: "There could be a great deal higher output rate if the industry could be settled down in fixed types. But the demands of modern war required constant changes of type and retooling when one type went out of production and another went in. Three plants were out of production because they were retooling for a new type. On a basis of comparative floor space occupied and type of planes produced, I do not hesitate to compare our production with that of any country. Details of types could not be made public but a large four-motored bomber type is to be made in a Toronto aircraft plant where retooling is now in progress. This means considerable laying off of workers temporarily, but they will all be absorbed. There has been a shortage of aluminum forgings in the Noorduyn plant in Montreal, but this would be quickly overcome and production there is stepping up very fast."

Mr. Howe stated that plans for the production of the Martin bomber in Canada stopped before retooling was completed, when the British government asked for a change to production of four-motored bombers. The National Steel Car plant at Malton was making parts for the Hampden bombers, which were being assembled at a plant close by, Mr. Howe stated, but the Hampden was "no longer of sufficient value as a fighting machine to be useful in the war" and production was suspended. He stated production of the new four-motored bombers would be the task of associated aircraft companies and would be carried out in an annex of the National Steel Car plant. Another secret plane is being built at the DeHavilland Aircraft plant in Toronto — a two-motored craft capable of flying the Atlantic. It will be an all-Canada craft except for the engines. All these changes involved some suspension of production during the changeover period but the lay-offs would be of a very temporary nature, Mr. Howe stated.

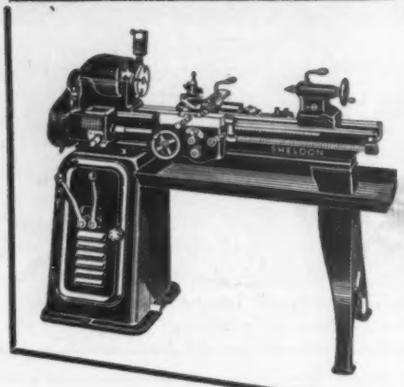
The government also was criticized by a House member for not having developed steel making resources and built up a reserve of scrap metals early in the war. The destroyer construction program was said to have been given up because of steel shortage, yet there was a tremendous output of steel shells and the war had not yet developed into a shooting war. To this Mr. Howe stated that the destroyer program had not been abandoned, but keels for two Tribal class destroyers had been laid last week in the Halifax ship-

VICTORY! This challenge is to engineers, metallurgists and craftsmen alike . . . Castings for VICTORY like today's men at the front, must show their mettle as never before . . . by placing your requirements for Steel Castings before the skilled personnel of the Erie Forge Company, you are wasting no time with experimentation . . . you are doubly sure because here, under one management, one responsibility, and one control, are turned out Steel Castings to your specifications or to those of Erie Forge Engineers, whose analysis and subsequent specifications you have accepted . . . Today, when speed, precision, and quality in materials and workmanship count so vitally, your requirements for Steel Castings are safe in the hands of the Erie Forge Company.



ERIE FORGE COMPANY, ERIE, PA.

SHELDON Back Geared Screw Cutting PRECISION LATHES

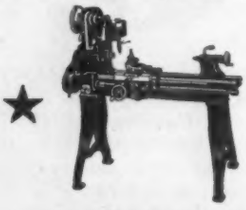


FOR THE TOOL ROOM

The finest 10", 11" and 12" lathes ever built in the moderate price field. Large special analysis steel spindles *ground all over*, with extra collet capacity. Hand scraped Bronze, Ultra-Precision Ball or Super-Precision Roller spindle bearings (the finest bearings obtainable). Heavy braced, semi-steel beds with hand-scraped ways (2 V-ways and 2 flat ways). These lathes come with a choice of aprons, gear boxes, and drives including the anti-friction, 4-speed, V-belt Lever-operated pedestal base motor drive illustrated. Telescopic Taper Attachment and other accessories available.

FOR PRODUCTION

Sheldon Lathes will stand up to any production work within their capacity—are ideal for second operation work. Production models available with any or all of these features: Ultra-Precision Ball or Super-Precision Roller spindle bearings, Lever-operated Collet Attachment, Lever-operated Tail Stock, Lever-operated cross slide with double tool post, Lever-operated turret, etc.



FOR MACHINE SHOP

Both Bench and Floor models with choice of Semi-quick or Full-quick Change Gears, Plain Aprons or Worm Feed Apron with Power Cross Feed. Overhead, Back or Underneath Motor Drives — Telescopic Taper Attachments, Tool Post Grinders, Milling attachments and all standard accessories.

Also a full line of Arbor Presses and milling machine Drill Press and Shaper Vises.

Write for Catalog and name of nearest distributor.

SHELDON MACHINE CO., INC.

4240 N. Knox Ave. Chicago, U.S.A.

yards. Mr. Howe stated there had been a great increase in basic steel production and alloy steel production had increased by five or six times since the war started. A large reserve of scrap iron was available, he stated, and was being protected by wide scale salvage campaigns throughout Canada.

Rep'ying to a question as to what use would be made of the plants represented in the $380,000,000 of capital assistance so far given war industries by the government, Mr. Howe stated he would like to be "a little farther on" in the war effort before working on that problem. He stated that specific commitments had been given in only a few cases. These involved establishment of plants in which secret processes would be used. Those whose processes were being used and who operated the plants were promised first chance to buy the plants when the war is over.

Lend Lease Orders For Steel Increase

Pittsburgh

• • • **All out war effort** with the possibility of opening a new western front in Europe seems to be indicated in the tremendous expansion of lend-lease requirements scheduled for shipment over the next 3 or 4 months. It is understood a rush shipment of steel is being asked for by June 15.

Requirements for July, August and September, it is said, total to a large amount. Furthermore, even though these requirements have been set up for a three-month period, high government officials are said to be demanding that the whole tonnage be shipped as soon as possible.

Such rush tonnages which will take semifinished and ingots away from domestic production are in such demand that they outweigh the importance of domestic finished steel production.

CHEMIGUM: Here is the first batch of Chemigum (synthetic rubber) rolling from the intricate mass of reactors and tanks in the government-sponsored addition to the Goodyear Tire & Rubber Co. plant in Ohio.

Official U. S. Signal Corps photo

"Jack-in-the-box"

● To the Army, a tank commander is a Jack-in-the-Box. You know why when you see the turret of one of these steel behemoths swing open, and a grease-grimed figure in a crash helmet pops into view.

Here's the newest and biggest—the M1—60 tons of bruising, crushing power—impervious to ordinary anti-tank fire—with the concentrated attack of two cannon, and a battery of 30 and 50 caliber machine guns.

The first of these mobile forts made its debut the day we declared war. Since then DeVilbiss Spray Equipment has been helping to speed up their production by painting them inside and outside in a fraction of the time required by obsolete coating methods.

So everywhere, in arsenals, navy yards and private plants, DeVilbiss Spray Systems are speeding the coating and finishing of many types of arms and munitions for which an urgent world is waiting.

If your plant is engaged in war production, your finishing operations should be geared to top speed production. If they're not, you need modern DeVilbiss Spray Equipment. You need it, not next year, not next month, but NOW.

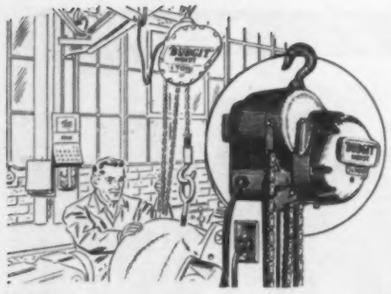
THE DEVILBISS COMPANY • TOLEDO, OHIO

Canadian Plant: WINDSOR, ONTARIO

• • •

THE COMPLETE DEVILBISS LINE CONSISTS OF: Spray finishing equipment • Automatic coating machines • Tanks for spray materials Spray booths and exhaust fans for vapor and dust elimination Air regulators, cleaners and dusters • Air compressors • Respirators Specialized hose for paint, air, water, gasoline, welding and pneumatic tools • Hose connections • Water and oil guns • Equipment to prevent offset in printing • Paint stripers • Medicinal atomizers.

DEVILBISS SPRAY SYSTEMS



Multiplied muscles

WHERE manual lifting delays production, an electric 'Budgit' Hoist increases the output of the worker. All his muscular strength and mental energy are then devoted to the job—not to wasteful lifting. Hang up, plug in and use. Those are the only installation instructions. Throughout the whole country many thousands of 'Budgit' Hoists are serving war industries. They are especially valuable when older men *and women* are called into the production line.

'Budgit' Hoists are portable, electric hoists with lifting capacities of 250, 500, 1000 and 2000 lbs. They are priced from $119 up. For complete information, write for Bulletin 348.

Send for catalog containing complete information on Hoists, also, "Time Saving Calculator" that shows savings they earn.

MANNING MAXWELL & MOORE TRADE MARK

'BUDGIT' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

AP Photo

WOMEN PATROL PLANE ASSEMBLIES: Watching the final assembly lines at the Hagerstown, Md., plant of Fairchild Aircraft Co., these women guards watch for fire, accidents, and sabotage.

Wide Strip Mills Submit Cost Data on Plate Expansion

Pittsburgh

• • • **Within the past week** steel companies having large continuous mills have submitted data on the cost and ability of these companies to step up substantially the amount of plates now being turned out on wide strip mills.

It is said that WPB has asked for increases ranging from 20,000 to 25,000 tons of plates a month on some units. Such additional tonnages will mean that some wide strip mills originally set up for 60,000 tons of sheets a month may be actually turning out 70,000 to 75,000 tons of plates a month. According to informed sources, the success of the latest program will conceivably meet Admiral Land's goal of 1,250,000 tons of plates a month, a figure which he mentioned when in Pittsburgh last week.

The WPB trend toward holding up expansions, it is said, definitely stems from the ability of steel mills and equipment makers to operate present facilities far beyond original estimates of production.

Plate mills are far outdistancing so-called theoretical capacity and some wide strip mills are producing more than 100,000 tons of flat rolled material a month, compared with an initial capacity rating of 60,000 to 70,000 tons a month.

Concrete Joists Designed To Save Roof Girders

Tonawanda, N. Y.

• • • **Production of** concrete joists, designed to save 62 per cent of the steel normally used in girders to support factory roofs, has been started at the Gravel Products Corp. plant here, Ernest M. Hammond, president, announced this week. The joists are 14 inches high with a 34-ft. span. They weigh approximately 3,500 pounds.

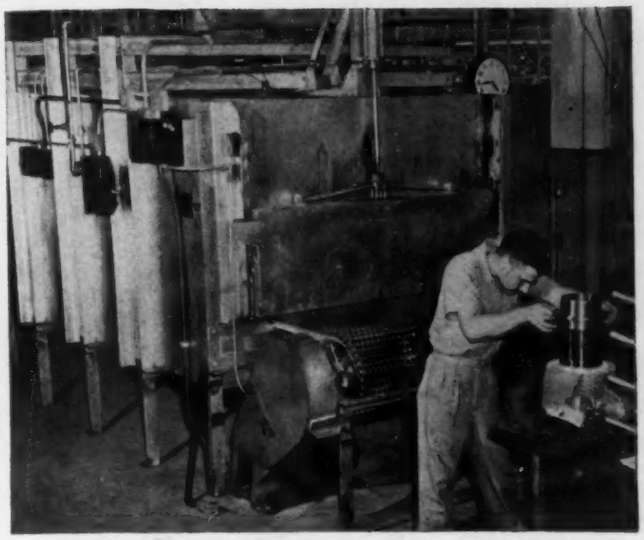
Speakers at the dedication of the new plant on June 6, will include Professor F. N. Menefee, University of Michigan; L. C. Kingscott, president of Louis C. Kingscott Associates, Kalamazoo, Mich.; and H. S. Hicks, sales engineer for Precast Units Co., Detroit.

Soviet Reported Inquiring For Steel Mill Equipment

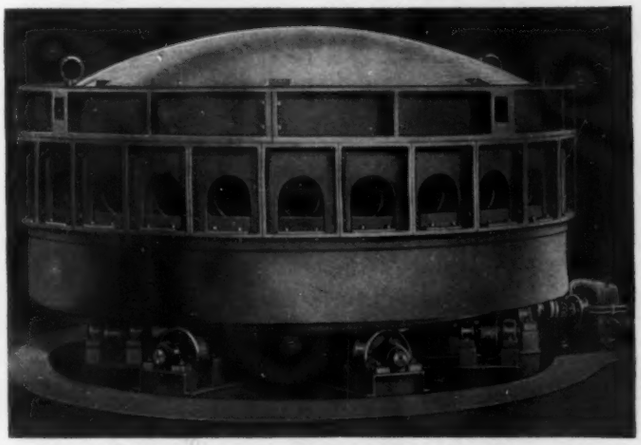
Pittsburgh

• • • **While nothing** definite has been decided, it is understood Russia is making specific inquiries in this country for production of steel plants, blast furnaces, and rolling mill equipment. No orders for this material have been placed but conversation is going on constantly and on such questions as ability to deliver, length of time involved, etc.

If you heat treat metals INVESTIGATE



Above—A MAHR continuous type furnace used in a large aircraft engine plant for heating aluminum heads to 470°.



Above—A MAHR center fired, rotary shell nosing furnace in use for many months giving steady, satisfactory performance.

Below—Modern, high speed shell hardening, quenching and drawing furnace for 75MM, 90MM, 105MM, 155MM high explosive shells.

THESE ADVANTAGES OF MAHR INDUSTRIAL FURNACES—OVENS

- Full range of types and standard sizes
- Quick heat up and uniform treating temperature easily maintained
- Special jobs quickly and accurately designed
- Astonishingly prompt deliveries

Yes, if you heat treat metals, it will pay you to talk with us, because for over a quarter century our engineers have been designing and our factory building—often PIONEERING—the most modern units for every type of heat treating.

Today, when speed AND QUALITY are "must"—when tanks, ships, planes, guns, shells, etc., *must* be right the first time—reliable furnace equipment of known quality should be demanded.

FOR EVERY HEAT TREATING NEED

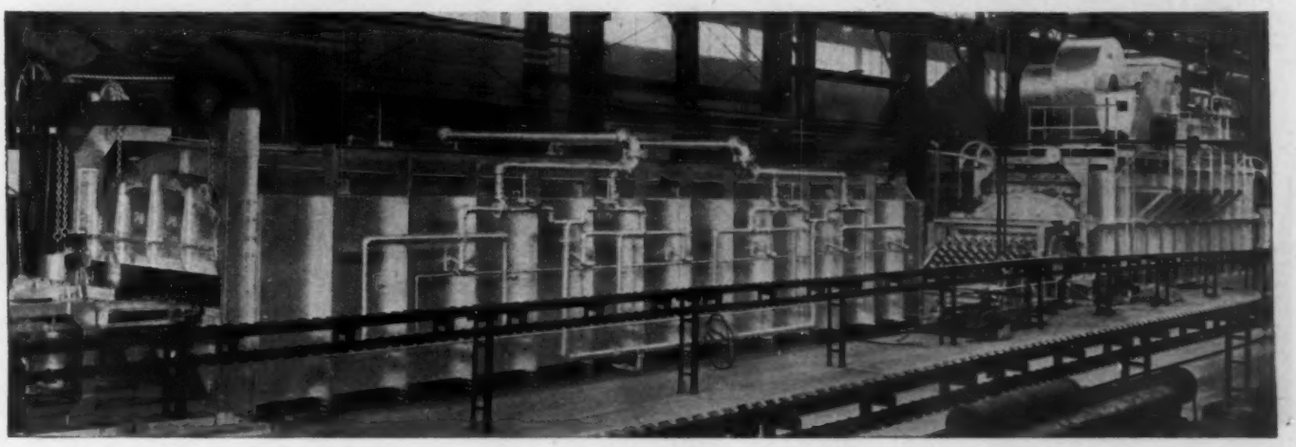
ANNEALING, CARBURIZING, BAKING, HARDENING, FORGING, DRAWING, STRESS RELIEF—CAR BOTTOM, PIT, PUSHER, ROLLER HEARTH, CONTINUOUS, POT . . . . RIVET FORGES, TORCHES, BURNERS, BLOWERS, VALVES.

MAHR MANUFACTURING CO.
DIV. DIAMOND IRON WORKS, Inc.

GENERAL OFFICES—MINNEAPOLIS, MINN.
SALES OFFICES IN PRINCIPAL CITIES

WRITE, WIRE OR PHONE TODAY

Our engineers will gladly help you select the type unit you need, and we'll give you complete information on any specific request. There's an engineer-representative near you for quick consultation.



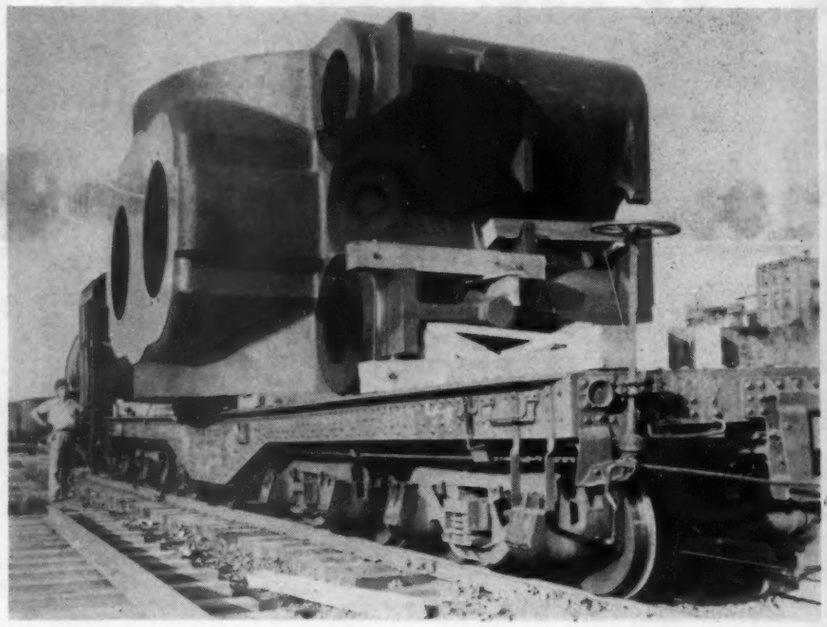
GUSHER COOLANT PUMP

KEEP your Machine Tools YOUNG!

Don't let the steady flow of defense work in your plant be tied up by a tardy machine tool. Insure the satisfactory and continuous functioning of your machines by using Ruthman Gusher Coolant Pumps.

They really do a good job—so much so that they are now standard equipment on many well-known machine tools. Therefore specify Ruthman Coolant Pumps —the pumps that keep your cutting tools young.

The RUTHMAN Machinery Company
CINCINNATI, OHIO, U.S.A.
1821 Reading Road



AP Photo

LARGEST CASTING: It took 600,000 lb. of steel to make this top cap for a 12,000-ton armor plate press. The casting, said by the company to be the largest ever produced, was made by Mesta Machine Co., Pittsburgh.

New Plants to Use Less Structural Steel

• • • A study of recent building construction awards reveals an increasing trend toward substitution of wood and of reinforced concrete for structural steel. Typical of this are plans for a large factory building, originally designed to use 15,000 tons of structural shapes. Its design has now been completely altered to reinforced concrete construction, which will use but 5000 tons of reinforcing bars. Another bid which called for 1500 tons of structurals for crane runways has been withdrawn in favor of wood. Structural steel men believe that the trend, which is just making itself felt, will become more pronounced in the months to come.

J. & L. Votes Dividend

Pittsburgh

• • • **Jones & Laughlin Steel Corp.** last week declared a dividend of $1.25 a share on its 5 per cent cumulative preferred stocks, series A and B, to holders of record at the close of business June 5, payable July 1. The board also declared a dividend of 75c. a share on its common stock to holders of record at the close of business June 5, payable July 6.

Gas Cutting and Welding Safety Standards Revised

• • • **Revised standards governing** the installation and operation of gas systems for welding and cutting were adopted at the recent annual meeting of the National Fire Protection Association as a result of the number of serious fires that have occurred recently because of careless cutting and welding methods. They apply to all gas welding and cutting systems and cover all gases used with oxygen for welding, cutting, heating.

The installation and operation of stationary acetylene generators are regulated with regard to location, ventilation, lighting and heating, etc. Portable acetylene generators, service piping systems for all gases, the manifolding of cylinders to headers for shop pipeline supply systems, storage of cylinders of gases and of calcium carbide, and operating procedure, all are carefully considered and regulated.

WPB Names Machinery Official

• • • **Ivan Anderson,** Mamaroneck, N. Y., has been appointed assistant chief of the WPB Special Industrial Machinery Branch. Mr. Anderson formerly was president of Dobson-Anderson Corp.

Every Farm!

Every Household!

Every Manufacturing Plant!

Can still contribute largely to increasing the supply of scrap which is absolutely necessary to the production of the Vital Equipment required to win the War.

☆ ☆ ☆

GET YOUR SUPPLY QUICKLY TO THE PROPER COLLECTING AGENCY – THE TOTAL WILL BE

Surprisingly Great!

Ohio Ferro-Alloys Corporation
Canton, Ohio

Most of Pay Hike Seen Coming from War Chest

Chicago

• • • **Wage increases** in war industries operating under price ceilings and paying maximum tax rates would come in large part out of Uncle Sam's war chest, it was indicated here recently in a study of testimony presented to the War Labor Board by Inland Steel Co.

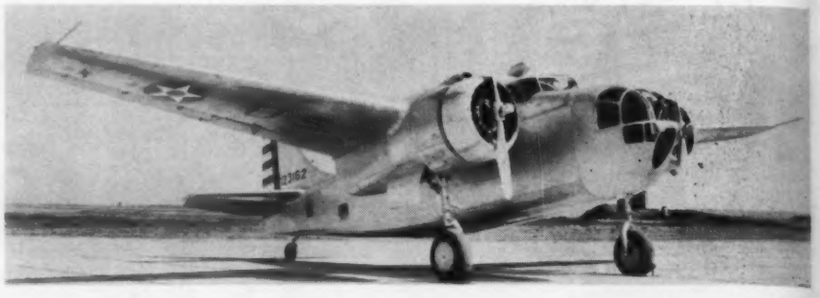
The Steel Workers' Organizing Committee has demanded a flat dollar-a-day wage increase, plus the closed shop, plus dues check-off from Inland and three other steel companies, declaring it would seek the same advantages throughout basic industry under its so-called vicotry program.

Assuming that treasury proposed tax rates for 1942 become law, Inland pointed out, 88.75 per cent of the demanded pay hike in its case would come out of reduced federal taxes with Inland paying only 11.25 per cent of the increase.

Showing how increases granted to steel workers would spread throughout basic industry, Inland indicated the loss to the treasury and said such loss would have to be made up by increasing all tax rates or by borrowing.

The net effect would be to increase consumers' incomes and to decrease federal revenues and "both of these results would be undesirable and inflationary," Inland told the board.

Other testimony showed that Inland's employes, with average hourly earnings of $1.03, and those of the iron and steel industry generally are among the elite of labor, and definitely "not a sub-standard wage group."



Harris & Ewing Photo

BOMBER TRAINER: The Boeing AT-15 is the first trainer specifically designed and equipped for integrated tactical training of pilots, co-pilots, bombardiers, navigators, and gun crews. The AT-15 is in reality a small bomber, complete in every detail, but is built of non-critical materials, using wood, steel tubing, and other items in place of stainless steel and aluminum.

Hobart Issues Training Booklet On Practical Arc Welding

• • • **The complete series of** 41 arc welding lessons given at the Hobart Trade School, Troy, Ohio, are now being offered in booklet form under the title of "Lessons In Practical Arc Welding." The booklet is bound in paper covers, has 188 pages and sells for 75c. per copy.

Chapter headings include preliminary instructions, starting and manipulating the arc, welding joints with bare electrodes, welding light gage sheets with coated electrodes; general welding with coated electrodes in the flat, horizontal, vertical and overhead position; pipe welding, welding cast iron, and special practice tests. The text also contains suggested classroom procedure and reference index.

T.C.I. Makes Appointment In Public Relations Branch

Birmingham

• • • **The Tennessee** Coal, Iron & Railroad Co. has announced the appointment of Randolph L. Fort as acting assistant director of public relations. Mr. Fort goes into the position heretofore filled by Steve McGinnis, who was recently commissioned an officer in the Air Corps. Fort has been a professor of journalism in the University of Alabama.

"Get in the Scrap"

with DINGS MAGNETIC SEPARATORS

Follow the ERIE PLAN!

THE ERIE PLAN of Industrial Conservation set up by the leading manufacturing interests of Erie, Pa., has received full endorsement of the Bureau of Industrial Conservation of the War Production Board and is rapidly becoming a model plan for other industrial centers. Designed to salvage and reclaim every possible pound of critical materials including iron and steel, non-ferrous metals, rubber, woolen, cotton, wood, burlap and miscellaneous materials, the Erie Plan has sent salvage managers into every nook and cranny of their plants to ferret out waste materials that can be used to help win the war.

You, too, can Get in The Scrap with a salvage system that will pay you and your country well. Do it now—time means everything.

Dings MAGNETIC SEPARATION HIGH INTENSITY

• Dings High Intensity Magnetic Separators can help you speed up reclamation and conservation, help you to get more and more vitally needed metal to fill the hungry maw of all-out war production.

Reclaiming iron from the waste pile, from foundry sand, from slag . . . separating ferrous and non-ferrous scrap . . . taking iron out of reclaimed non-metallics . . . concentrating ore . . . handling scrap and other metal—these are a few of the jobs Dings Magnetic Equipment can do to help.

Write to Magnetic Separation Headquarters today—and ask for a copy of The Magnetic Alchemy Bulletin.

DINGS MAGNETIC SEPARATOR CO.
516 E. Smith Street • Milwaukee, Wisconsin

World's Largest Exclusive Builder of Magnetic Equipment—Established 1899

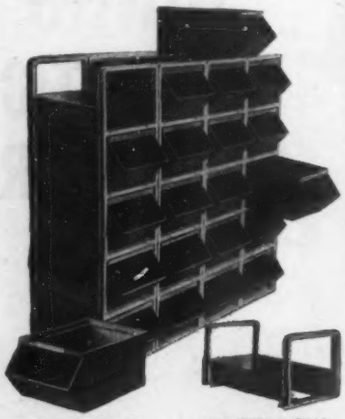
EXPAND STORAGE FACILITIES . . . OVERNIGHT!

With the Stackbin System's portable units you can expand storage facilities and speed up the flow of parts and materials . . . overnight—as many plants flooded with war orders have already done!

Stackbin units fit into any spot—in stockrooms, under benches, near machines. Can be placed within easy reach of assemblymen. They save production time because parts can be found at once without piling and unpiling boxes; because parts do not need to be transferred from bin to tote pan and back to bin again. Get complete details! Write for "LOWER COST STORAGE AND HANDLING". Stackbin Corp., 89 Troy St., Providence, R. I.

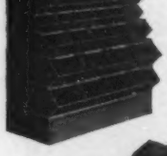
IDEAL STOCKROOM UNIT

is this combination of Stackbins-in-Stackracks. Parts and materials are transferred from one department to another, are used or processed and passed along in their storage container. No waste time—less loss, less damage.



STACKBINS are individual hopper-fronted storage bins — with perfectly smooth interiors — which nest to form work units and slide in Stackracks like drawers for storage.

STACKRACKS are individual racks of heavy steel—made in any size you need. Locking together without tools, they make a strong, rigid storage rack of any capacity, height or shape you want.



AS FLEXIBLE, EASY TO ASSEMBLE as sectional bookcases, nested Stackbin sections provide temporary storage space wherever needed. Many modern plants use them as room or departmental storage "depots".

SLOPING FLOORS permit Stackbin Assembly Bins to feed parts continuously towards the front of the bin. Tapered front design provides semi-circular set-up, so that all parts are within easy reach.

All units in the Stackbin System are constructed of heavy steel — welded for permanent rigidity.

STACKBIN

STACKED AND STILL ACCESSIBLE

SYSTEM

STACKBIN CORPORATION
89 Troy St., Providence, R. I.

Specific Instructions To Allocation Classification

• • • **The Production Requirements Plan,** as it is being set up by the WPB under General Preference Order P-90, is designed primarily to simplify industry's work under the system of priorities. Through the use of the Allocation Classification system, formerly termed "The End Use Code," a ready means of identifying the sub-divisions of the war production program is offered, showing the ultimate destination of materials and products together with their immediate identification down through processing from the prime contractor to the most remote supplier of materials.

The Allocation Classification symbols for Military, Industrial, and Civilian industries under the system, together with the purpose and general instructions of the system are shown in the special Priorities Section that accompanies this issue of THE IRON AGE.

The system of symbols assigned to the various classifications of industry do not relate to the importance of these classifications, but are merely an orderly arrangement of all classes of industry by which their associated and required materials can be identified.

The specific instruction issued by the War Production Board will be carried in THE IRON AGE in three installments, the first of which begins with this issue.

SPECIFIC INSTRUCTIONS

Classes 1.00 Through 7.00—Military

The responsibility for placing the proper allocation symbols for the military classifications rests with the Army, Navy, and Maritime Commission officers who will also indicate, on all new orders, whether the order is for the Army or Navy and Maritime Commission.

Class 8.00—Raw Materials, Production and Preliminary Processing Of

This allocation classification is to be used by industries engaged in the production and preliminary processing of raw materials. The production and preliminary processing of raw materials is defined here as the operations required to convert them from the state in which they were found in nature to the condition in which they are described in Materials List No. 1. For example, all the steps necessary for turning standing timber

SALVAGING THE NORMANDIE: To Commander William A. Sullivan, center, falls the responsibility of righting the Normandie, now the U.S.S. Lafayette. Here, with Commander Carl Chandler, left, and Captain John Tooker, right, he is inspecting a scale model of the ship.

Wide World Photo

AJAX

Now Delivering Huge 8-Inch Forging Machines at an Unprecedented Rate

These 8-inch, 470,000 pound Ajax Forging Machines are the largest ever built with the rigid one-piece integral bed frame.

BUY FORGING EQUIPMENT ON THE BASIS OF MECHANICAL SOUNDNESS

● No comfort in that performance for the Axis, but plenty for American industry and its craftsmen, driving hard day and night to turn out more and better weapons of war—*in time!* The output of these 470,000 pound 8-inch Ajax Forging Machines has been stepped up tremendously. We are now equipped to again step up even this output . . . and do it without sacrificing established Ajax Standards of mechanical soundness.

Improvement of Ajax manufacturing facilities and training of new craftsmen—initiated ahead of need—is enabling us to accomplish this without tying up vitally needed heavy machine tool capacity outside of our own plant. Output of other sizes of Ajax Forging Machines and Forging Presses is up too, assuring that the productive ability of American war workers may be utilized to the very utmost in producing the vital fighting equipment that can be formed better, faster and cheaper on Ajax Forging Machinery.

The high standards of production, accuracy, and dependability being established by Ajax Forging Machines under the gruelling pace of war production emphasizes again the wisdom of buying forging equipment on the basis of mechanical soundness. For more information on Ajax Air Clutch Forging Machines, write for Bulletin 65-B.

THE AJAX MANUFACTURING COMPANY
EUCLID BRANCH P. O. CLEVELAND, OHIO
621 MARQUETTE BUILDING • CHICAGO, ILLINOIS

EASY AS ROLLING OFF A LOG...
BETTER... FASTER ASSEMBLY
JOBS WITH PHILLIPS SCREWS
"AND DON'T FORGET!
PHILLIPS SCREWS COST LESS TO USE!"

One Hand Driving • Power Tools • Tighter Assembly = 50% Less Assembly Time with Phillips Screws

B. P. (Before Phillips). Slow-driving slotted screws required two hands to aim the screw and steady the work — and still accidents happened, causing plenty of mangled fingers or scars in the work. Always something going wrong — crooked screws — heads splitting — burrs to remove — loose assemblies. Thank goodness those days are gone forever!

A. P. (After Phillips). Faster-driving Phillips Recessed Head Screws need only one hand . . . the other hand is free for support. No fumbled screws — straight, effortless driving. Even when assembling parts already finished — like enameled, painted or other easily-scratched surfaces — power driving is safe, because there's no danger of driver slippage. And screws can be set up tight without heads splitting or raising burrs.

Your assembly crew will find it "easy as rolling off a log" to produce better work . . . in half the time . . . at a 50% cost saving with Phillips Screws.

For facts and screws write any firm listed below.

PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

into accepted shapes and sizes of lumber would fall into this category. The steps to fabricate the lumber into other wood products would not be included.

In the case of agricultural products, the steps to be included in this classification start after the product has been harvested and continue until it is ready for industrial use, for example, the processing of cotton only through the ginning.

These symbols should be placed on all orders for supplies, equipment, machinery and facilities necessary for the production and preliminary processing of raw materials but should not be placed on orders for materials which are processed or are incorporated in the finished raw material. All orders for materials which enter into the production of or become a part of the finished raw material will bear the symbol transmitted by the customer's orders. For example, a steel mill producing rails for a railroad company will transmit the railroad's symbol of 10.10 on all orders for iron ingots, coke and alloy metals. Orders for office machinery, metal working machinery and other operating equipment and supplies will carry the symbol of the steel mill (8.10).

Where a company processes raw materials only as an incident to its main production, it should not classify its order with any of the numbers in this classification, but should use only the number that applies to its main operation.

Construction of new buildings, and building maintenance and repair should not be included in this classification (see Classes 21.00 and 22.00).

8.10—All Metals, Production (including Mining), Smelting and Preliminary Processing Of:

This allocation symbol should be placed on purchase orders for supplies, equipment, machinery and facilities issued by companies conducting such operations as:—

Aluminum plants, brass mills, copper refineries, smelters, steel mills, all types of metal mining, etc.

8.20—All Chemicals, Production and Preliminary Processing Of:

This allocation symbol should be placed on purchase orders for supplies, equipment, machinery

and facilities issued by companies producing and processing chemicals up to the point that they are ready for industrial use.

Chlorine, alcohol, sulphur, lacquer, paint, plastics, synthetic rubber, varnishes, etc.

8.90—All Other Raw Materials, Production and Preliminary Processing Of (Exclusive of petroleum, coal and coke, see Classes 9.20 and 9.30):

This allocation symbol should be placed on purchase orders for supplies, equipment, machinery and facilities issued by companies conducting such operations as:—

Manufacture of textiles, glass making, lumbering, and production of building materials, for example, asphalt, stone products, brick, plaster, cement, sand, etc.

Class 9.00—Power, Light and Heat:
9.10—Electricity

All public electric generating and distributing systems should place this classification number on all purchase orders issued by them except for construction of new buildings, and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

This classification is not to be used on orders for wiring and equipment necessary to make use of electricity in a plant or in the home. The wiring and equipment for distributing electricity through a plant, home, etc., and orders for private, industrial, farm or home generating plants, should bear the proper symbol for new construction or building maintenance and repair (see classes 21.00 and 22.00).

9.20—Petroleum

All companies concerned with the production of petroleum, refining, pipe line construction and operation, storage and retail distribution of petroleum, oil and gasoline, should place this allocation symbol on all purchase orders they issue.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

9.30—Coal and Coke

All companies engaged in the production and distribution of coal and coke should place this

"I AM HEAT-FAG. I attack workers who sweat — who lose body salt and then don't replace it. Through fatigue and inalertness, I make them 'drop their guard' — I not only spawn . . . I cause accidents."

Heat-Fag is the all-out, unseen enemy of production. Thousands, yes, millions of precious man-hours can be lost through this insidious force that saps men's strength—lowers their efficiency —wears them down before the shift is over. Salt sweated from the body must be replaced — or Heat-Fag takes its toll.

AVOID HEAT-FAG—USE
MORTON'S
SALT TABLETS

QUICK DISSOLVING
(less than 30 seconds)
This is how a Morton Salt Tablet looks when magnified. Examine one—see how soft and porous it is inside. When swallowed whole — with a drink of water, they dissolve in less than 30 seconds.

Wherever workers sweat, Salt Tablets are needed, for they represent the simple, easy way to replace salt that's lost through sweating and hot work.

Case of 9000 10-grain salt tablets, ... $2.60

Salt-Dextrose Tablets, case of 9000 . . . . . $3.15

Order from your distributor—or directly from this advertisement.

Place MORTON'S DISPENSERS at all Drinking Fountains
They deliver salt tablets, one at a time, quickly, cleanly — without waste. Sanitary, easily filled, durable. 500-tablet size, $3.25. 1000-tablet size $4.00

MORTON SALT CO., Chicago, Ill.

FREE Sample Tube
Write—on your firm letterhead — for a pocket size sample tube of Morton's Salt Tablets and for the new folder — "Heat-Fag and Accidents Ride Together."

EVERYONE WHO SWEATS NEEDS SALT

allocation symbol on all purchase orders they issue. The construction of coke ovens should be included but the construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

9.40—Gas

All public gas companies engaged in the production and distribution of both natural and manufactured gas should place this allocation symbol on all purchase orders for material, equipment and supplies, etc., that they issue except for construction of new buildings and building maintenance and repair (see classes 21.00 and 22.00).

Orders for equipment and pipe for using gas in industrial plants and homes should not bear this number but should be classified with the proper construction symbol (see classes 21.00 and 22.00).

Editors Note: Classes 10.00 to 15.00, inclusive, of the Specific Instructions under the Allocation Classification system will appear in next week's issue of* THE IRON AGE, *and classes 16.00 to 23.00, covering the remaining classifications of industry, will appear the week following.

Weirton to Send Drafted Employees Vacation Pay

• • • **Employees of** the Weirton Steel Co. who have entered military service since Jan. 1 will receive the vacation pay to which they would have been entitled were they still with the company. Those who entered the armed forces before Jan. 1 will receive checks for $25. An estimated $750,000 will be paid out by the company this year to all its employees under a new "optional vacation plan" agreed upon by the company and union, which provides either extra pay or time off for hourly, piece rate and tonnage workers.

Foundrymen to Hold Annual Outing June 13

Philadelphia

• • • **The Philadelphia chapter,** American Foundrymen's Association, will stage its annual outing at the Hi-Top Country Club, Drexel Hill, Pa., on Saturday, June 13. Luncheon will be served from noon to 2 p.m., followed by baseball, golf and free beer.

HAVE YOU A Problem in

Capitalize the Service of the Carey REPRESENTATIVE

Today, more than ever—the big job of the Carey representative is *serving* industry. His time for the duration is dedicated to helping you attain utmost economy in plant maintenance—top efficiency in plant operation.

Every Carey man is thoroughly trained from the ground up in the use and application of Carey Products. Representing one of the oldest and largest manufacturers of roofing, waterproofing and insulation materials in the country, he is qualified by experience to make practical recommendations.

Capitalize this Carey service when our representative calls on you. Whatever your needs, you'll find that he will do everything humanly possible to be of real help in analyzing your problems and in finding the economical answers. For details address Dept. 26.

Carey PRODUCTS INCLUDE:
BUILT-UP ROOFINGS • ROOF COATINGS
HEAT INSULATIONS • CAREYDUCT
INDUSTRIAL ASPHALT FLOORING
ASPHALT ROOFING & SHINGLES
ROCK WOOL INSULATION
ELASTITE EXPANSION JOINTS
ASBESTOS-CEMENT CORRUGATED ROOFING & SIDING

THE PHILIP CAREY MFG. COMPANY
Dependable Products Since 1873
Lockland, Cincinnati, Ohio
In Canada: The Philip Carey Co., Ltd.
Office and Factory: Lennoxville, P. Q.

ARC-WELDED RESERVOIR: This arc welded steel reservoir, capacity 2.5 million gal., was recently completed for the city of Tulsa, Okla. The reservoir, which has a self-supporting elipsoidal roof, was erected by Chicago Bridge & Iron Co., using shielded arc equipment supplied by Lincoln Electric Co., Cleveland. It is made of eight rings of 90 in. wide plates ranging in thickness from 1 in. at the bottom to ¼ in. at top, is 85 ft. in diameter and is designed for a maximum stress of 16,000 lb. per sq. in. when filled.

Output Rapidly Mounting, War Rally at Chicago Told

Chicago

• • • **American industry is turning out** war materials at a rate which will very shortly give the United Nations a decisive advantage over the Axis countries, Chicago plant executives were told at a war rally held here last week under the sponsorship of the Illinois Manufacturers' Association and the National Association of Manufacturers.

The delays of converting a peacetime industry to war production have been largely overcome, J. S. Knowlson, chief of the WPB Division of Industry Operations, pointed out. Production is now hitting its stride, he said, and production of war goods will rise rapidly over the coming weeks.

A plea for more aid for the small manufacturer was voiced by Sterling Morton of the Morton Salt Co. and president of the Illinois Manufacturers' Association, at the rally. The small business man, he said, represented the foundation of democracy.

Morton suggested that one solution to the problem would be to turn the large war production jobs over to the large plants, with the small plants being assigned all civilian goods production.

PROMPT DELIVERY*

"Saved our necks!"

• "Production at full speed by the 10th . . . or else! That was the job that faced us. It meant new materials handling equipment — and a delivery date we could absolutely depend upon. Again, we turned to P&H because we know they won't make a promise they can't keep. This time they beat the promise . . . and enabled us to keep ours!"

★ **To meet the urgent need of the war program, P&H guarantees delivery date within ± 3%.**

P&H TRAV-LIFT CRANES FOR INTERMITTENT SERVICE

Around production lines, assembly floors, warehouses, loading zones, and in countless other locations, P&H Trav-Lift Cranes provide swift, low-cost materials handling to speed the war effort. Designed for intermittent service, P&H Trav-Lifts are offered in a variety of sizes and types with capacities up to 15 tons. Write for bulletin H-13.

Awarded the Navy "E" for excellence in war production, P&H displays it also as a pledge of future effort.

General Offices: 4401 W. National Avenue . . . Milwaukee, Wisconsin

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

PERFORATED METAL

INDUSTRIAL and ORNAMENTAL

Any Metal • Any Perforation

The uses for perforated metals are numerous and increasing. Industry requires it for a thousand purposes.

For ornamentation it provides beauty of design not otherwise obtainable. We offer a finished product, developed to fully meet the requirements you specify.

The Harrington & King PERFORATING Co.

5657 FILLMORE STREET—CHICAGO, ILL.
New York Office, 114 Liberty Street

WE PUT THE KIDS
TO BED IN 1865!
Atop the roof of the Dunbar spring plant is perched a bell... summoning the workers in the morning... sending them home at night. This bell also performs a community service... for, rung 99 times at nine in the evening, it sends all children home and to bed. The bell still rings... the tradition almost forgotten. But the tradition of fine workmanship still goes on in the hands of another generation of springmakers, whose talents are actively engaged in helping to meet the crisis of 1942.
1865
SINCE 1845
1942

Dunbar Bros. Co., Bristol, Connecticut

DIVISION OF ASSOCIATED SPRING CORPORATION

Mystic Furnace Resumes After 34 Days' Idleness

• • • **Mystic Iron Works,** Everett, Mass., blew in its furnace Memorial Day. The furnace had been blown out for repairs at midnight, April 5, which means that repairs and relining were accomplished within 34 days.

Current understanding with the government, it is understood, is that the furnace will be allowed to run at least a week before allotments to consumers will be made. After that shipments will begin, and the furnace will be shipping "hot" iron for some time.

While the government has been lenient about the furnace's early run, it, as well as consumers of pig iron (through the government priority channels), are putting the furnace to a hard test. The Mystic management, however, is confident it will measure up to all requirements.

Canada Bans Making of Sewing Machines for Homes

Ottawa

• • • **Department of** Munitions and Supplies announced that except by permit from Alan H. Williamson, controller of supplies, no more sewing machines for home use may be manufactured in Canada after June 1. Wholesale and retail sales of stocks on hand will not be affected. The order also prohibits the making of domestic sewing machine parts and cabinets except by permit. Mr. Williamson stated that manufacturers will be granted permits to assemble pre-fabricated parts which they have on hand when the order becomes effective, but after that no domestic sewing machines will be made in this country until the war is over.

Barnes to Head Alabama WPB

Birmingham

• • • **James P. Barnes,** treasurer of the Alabama Asphaltic Limestone Co., Birmingham, has been appointed Alabama manager for the War Production Board, and will ultimately take over the duties of L. E. Geohegan, Alabama district manager of WPB's contract distribution branch, whose resignation will become effective June 15. Mr. Barnes' offices are in the Phoenix building, Birmingham.

Superior Ore Shipments Over 90 Million Tons Seen

Washington

• • • **WPB on Tuesday** announced that the M. A. Hanna Co. says that more than 90,000,000 tons of iron ore will be furnished to the steel companies in 1942. The shipments for May broke all-time records, amounting to 12,622,872 tons. The season shipments to date, also record-breaking, are reported by the Hanna company to be 21,204,656 tons.

It was estimated that more than 50,000,000 tons will be shipped in June, July, August and September and from Oct. 1 to close of navigation another 16,000,000 tons will go down the Great Lakes.

Steel Container Coatings Limited Under M-15-a

• • • **Tung, oiticica,** perilla, or dehydrated castor oils; alkyd, phenolic, vinyl, urea or melamine resins or cellulose esters or ethers may not be used for coating steel containers of 2 gal. or greater capacity after June 20 under the terms of order M-15-a. The order further provides that after June 20 no person shall apply any coating other than black except for small areas of coloring required for marking or legal requirements. Users of container coatings are forbidden to accept delivery of any of the mentioned oils and resins except black, gray and white. General exceptions to the order are export, other than coatings containing tung or oiticica or orders for the armed services.

Steel Warehouses Asked to Curtail Schedule A Quotas

Washington

• • • **Steel warehouses** were asked on Tuesday to curtail their quotas of plates, shapes, bars, rails, armor plate and forgings, known as Schedule A products, or eliminate them entirely if possible. WPB says the elimination of these products from warehouse stocks for the duration of the war will permit their concentration in places where war demand is heaviest.

15 R&M HOISTS Speed this Firm's War Work!

Extremely compact construction and simplicity of R & M Hoist design make for maximum headroom and utmost strength. Once cover is removed, as shown here, entire mechanism may be quickly withdrawn.

AMERICA can't afford production jams, lost time and wasted manpower, *these* days! That's why the Wallingford Steel Company, Wallingford, Conn., is *speeding* war work with R & M Hoists.

Says Wallingford's Plant Engineer, "R & M Hoists are helping us handle steel coils faster than ever. And despite constant use, day and night, we have found that they require surprisingly little maintenance."

Above you see one of Wallingford's R & M Hoists mounted on an R & M Crane, handling steel coil in the cutting room. 14 other R & M Hoists, 8 of which are also mounted on R & M Cranes, are spotted throughout the plant.

Ability to handle loads from any angle, low headroom and sturdy construction make R & M Hoists perfectly suited to *your* plant, too! Get in touch with the nearest R & M sales and service office now. Or write us for complete details. It'll pay you to "take it up" with R & M!

R & M SALES AND SERVICE OFFICES

Albany.....364 Broadway
Atlanta.....319 Walton Bldg.
Baltimore, Lombard & Concord St.
Boston.....55 Long Wharf
Buffalo.....2005 Delaware Ave.
Chicago....2400 W. Madison St.
Cincinnati.....418 New St.
Cleveland..352 Rockefeller Bldg.
Dallas.....1100 Cadiz St.
Denver.....1420 16th St.
Detroit.....2921 E. Grand Blvd.
Houston..3715 Harrisburg Blvd.
Jacksonville....305 Bisbee Bldg.
Newark.....700 Bergen St.
New York.....200 Varick St.
Philadelphia.....401 N. Broad St.
Pittsburgh.....H. W. Oliver Bldg.
San Francisco, 116 New Mtgmry. St.
Seattle.....216 Walker Bldg.
Syracuse....204 State Tower Bldg.
Montreal....Lyman Tube & Supply Co., Ltd.

ROBBINS & MYERS • Inc.
HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

Seven Principles Fixed Governing War Construction

Washington

• • • **Principles governing** curtailment of war plant construction, which, as pointed out in THE IRON AGE, affect steel and other metal units, were formally promulgated last Saturday by WPB, the War and Navy Departments. The program adopted means that no new plants will be built unless they are absolutely essential and can meet the seven established points. The purpose is to make all possible material and effort available for immediate war production. The formula applies not only to direct war plants but to all other construction, both publicly and privately financed.

The seven criteria which must be met before any project will be approved for construction follow:

1. It is essential for the war effort.

2. Postponement of construction would be detrimental to the war effort.

3. It is not practical to rent or convert existing facilities for the purpose.

4. The construction will not result in duplication or unnecessary expansion of existing plants or facilities now under construction or about to be constructed.

5. All possible economies have been made in the project, resulting in deletion of all-nonessential items and parts.

6. The projects have been designed of the simplest type, just sufficient to meet the minimum requirements.

Sufficient labor, public utilities, transportation, raw materials, equipment and the like are available to build and operate the plant. The manufactured product can be used at once or stored until needed.

KENNAMETAL SPEEDS
Victory PRODUCTION
KENNAMETAL
THE All American CARBIDE
STYLE 2
STYLE 1
STYLE 6
STYLE 3
STYLE 9
STYLE 11
STYLE 12
STYLE 15
On old machines or new . . . on steels of hardnesses up to 500 Brinell, KENNAMETAL tools permit machining speeds 2 to 6 times greater than are possible with high speed steel tools. In addition, KENNAMETAL removes 3 to 10 times more metal between regrinds, and often combines roughing and finishing in one cut.
These KENNAMETAL advantages add up to MORE guns, planes, tanks and ships. That's why it's important NOW to put KENNAMETAL in your tool rest.
McKENNA METALS Co.
144 Lloyd Ave., LATROBE, PA.
Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York
(Exclusive of Canada and Great Britain)

Policy Is Formulated on Steel Industry Projects

• • • **According to a letter** last week signed by W. A. Hauck, chief of the planning unit, plant facilities section, WPB Iron and Steel Branch, the following policy is applicable to all projects for maintaining or increasing steel production including expansion, extensions, rehabilitation and revamping now underway or contemplated, whether government financed or company financed. The policy is likewise applicable to all repair and maintenance work wherever possible. Rigid adherance to this policy is required:

(A) All structures, equipment and material must be limited to indispensable bare necessities.

(B) Suitable substitutes for all critical and scarce materials and equipment are required.

(C) Structures shall be of the simplest temporary type except where the operation to be conducted therein necessitates more substantial construction. In such cases the degree of permanency and of design shall be limited to that just adequate for the needs with due regard being given to the pertinent building codes.

(D) The possibility of attaining objective by utilizing facilities made available by stoppage of civilian production must first be exhausted.

(E) Before the construction of any new project, a survey must be made of all available existing facilities susceptible to conversion for the purpose.

(F) Markets for second-hand machinery and equipment must first be explored and utilized before purchasing new machinery and equipment. Likewise, unused

structures which can be dismantled and reerected on the project site should be obtained wherever possible.

(G) Spares or standby equipment must be kept to a minimum consistent with good operating practice. Spares and standby equipment held by one company may be needed by another company as the initial operating equipment.

(H) Types of construction equipment and supplies should be simplified and standardized, using only existing more readily available types. Specials and "tailor made" equipment should be avoided.

Materials used in construction, maintenance and repair will be limited to those authorized by the Army and Navy Munitions Board "List of Prohibited Items for Construction Work" dated April 1, 1942. Materials of non-prohibited types which are more expensive than other adequate but less costly materials, must not be used.

Machine Tool Shipments Show Steep Rise in April

Washington

• • • **The value of** new machine tools, presses and other metal working machinery shipped during April was $114,100,000, it was announced last Saturday by William H. Harrison, director of production of the WPB. Shipments of machine tools alone amounted to 25,415 units, with a total value of $103,364,496. During March, 24,300 units, valued at $98,358,299, were shipped.

Production of metal working machinery has reached a rate of more than $1,300,000,000 a year and is steadily on the increase. Last year the value of metal working machinery was about $840,000,000 and the present going rate represents an increase of more than 60 per cent.

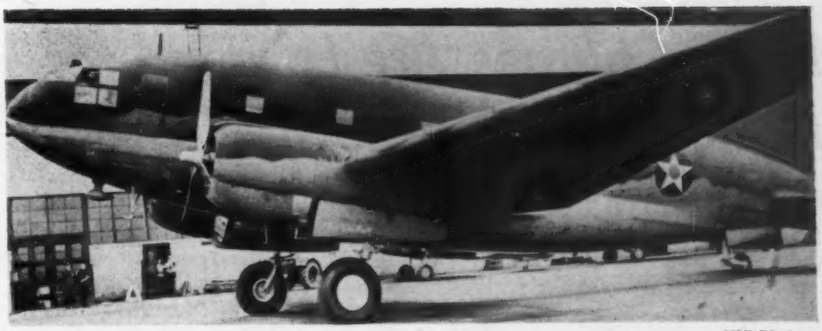
Compared with the same month of last year, the April value of all metal working machinery is an increase of 72 per cent.

On the basis of comparable companies which reported during March and April, the value for the latter month represents a 5 per cent increase. On a per day comparison between the two months, April represents an increase of 8 per cent.

ASM to Meet in Cincinnati

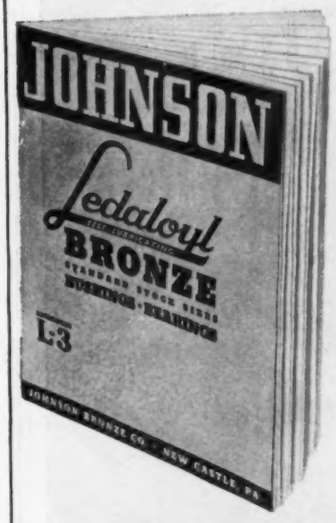
Cincinnati

• • • **Technical men** from the Indianapolis, Columbus, Dayton and Cincinnati areas as well as others engaged in war industries will attend the tri-chapter meeting of American Society for Metals here June 5. The meeting is to be held in connection with war production clinics to help industry gear itself to the use and treatment of emergency steels.



INS Photo

TROOPSHIP OF THE SKY: Designed for troop and equipment movement, this giant Curtiss-Commando, C-46, is the world's largest twin-engined ship of its type.



Write for this

NEW Catalogue

•

Self Lubricating

BRONZE BEARINGS

● This new book will save you time, trouble and money when ordering self-lubricating bushings or bearings. Thirty-six pages filled with useful, informative data will help you to accurately determine your needs. A complete listing of over 2000 individual sizes . . . including plain, flanged and spherical bearings . . . will help you design to standards thereby eliminating delay and die expense.

Competitive tests in practically every type of industry have definitely proven the superiority of Johnson Bronze LEDALOYL. Our exclusive process of PRE-ALLOYING the basic materials provides bearing qualities not obtainable by any other method.

Write for your free copy of this new book today. It will help you get better bearings—quicker. It is your first step toward improved bearing performance.

Ledaloyl

PROVIDES THE RIGHT AMOUNT OF OIL IN THE RIGHT PLACE AT THE RIGHT TIME

JOHNSON BRONZE

Sleeve BEARING HEADQUARTERS

505 S. MILL STREET • NEW CASTLE, PA.

Extra Charges Are Lowered for Nickel-Chrome "NE" Steel Grades

Pittsburgh

• • • **In the light** of recent experience with National Emergency alternate steels, alloy steel makers, effective June 1, revised downward the extra charges on the nickel-chrome grades covering steels NE 8620 to and including NE 8949. The extras were published originally in this magazine April 9. Practically all of the reductions amounted to 15c. a 100 lb. on finished steel and $3 a ton on semi-finished steel.

This action follows the general policy of steel companies to readjust extras as experience develops new factors. The National Emergency alternate composition ranges for basic open hearth and electric furnace alloy steel shown below were established after extensive consultation between steel companies and governmental agencies in order to have steel of suitable quality in case original composition ranges became unavailable because of heavy war demand. Below are details in chart form including the extra charges per 100 lb. on finished steel items and the extra charges per ton on billets, blooms and slabs, representing a revision of the chart shown on page 146, THE IRON AGE, April 9, 1942.

The National Emergency alternate composition ranges were established after extensive consultation in order to have steel of suitable quality in case original composition ranges became unavailable because of heavy war demand.

Last week the American Iron & Steel Institute issued the first batch of charts covering tests on NE steels. The data which the Institute has available for interested parties will be added to from time to time and are expected to become increasingly valuable.

End-quench hardenability tests have been made on single heats of most of the NE-8000 series low alloy steels. Data on tensile strength, elastic limit, reduction in area and Izod impact values are available on certain sizes of bar stock for various draw temperatures.

Designation	CHEMICAL COMPOSITION LIMITS,					
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35	.....
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35	.....
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35	.....
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35	.....
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35	.....
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35	.....
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35	.....
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35	.....
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60

Note: The extras shown above are in addition to a base price

"FIGHTING" SPEEDS FOR PRODUCTION MACHINES

• This shell cleaning machine, built by American Foundry Equipment Co., Mishawaka, Ind., has "fighting" speeds because it is equipped with a REEVES Vari-Speed Motor Pulley for complete speed flexibility. It can be operated as fast as skilled workers can keep up. Any desired speed instantly available at turn of handwheel *without stopping driven machine.* REEVES Variable Speed Drives put more "fight" into any production machine by providing full-range speed adjustability, accurate speed setting and positive operation. Result: less waste and spoilage—more accurate processing at a faster rate. Standard equipment on 1,440 different makes of machines. Easily installed on machines in service. Write for copy of Catalog-Manual IG-419.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Reeves Speed Control

Addition to Schedule 136

• • • **An extensive** and extremely important amendment to Maximum Price Order No. 136 (machines and parts) is in process, it was announced late last week. The price order becomes effective July 1.

It is expected parts and subassemblies not now covered under the schedule will be included in the amendment. There may be some other needed changes as outlined in THE IRON AGE, May 21, page 108.

The amendment will not be available until around July 1, effective date of the order.

Cancellation Clauses Gain

• • • **Cancellation** clauses are more frequent in orders extended to subcontractors and suppliers, the result of the widespread belief that the war might end suddenly. The United States Government has been seeking to dispel the sudden wave of optimism.

Steel Screen Cloth Action

Washington

• • • **Screen cloth sellers** whose sales are governed by Revised Price Schedule No. 49 were asked by OPA last Friday to refrain from increasing their prices until July 15, even though an increase in the mill prices of steel screen cloth was granted April 27 under an amendment to Revised Price Schedule No. 6. July 15 was selected as the probable date for the exhaustion of present inventories, and the OPA request is aimed at anticipatory price rises put into effect by dealers in possession of inventories bought before the increase in mill prices.

Price Administrator Henderson said he believes that if jobbers maintain the old price level until July 15, even as to shipments received at current mill prices, a fair average price level for jobbers' sales of screen cloth will be achieved.

Relief Given Several Mines

• • • **Price Administrator** Henderson has granted relief to several mines in West Virginia and Illinois whose petitions declared that established maximum prices did

PER CENT			Basic Open-Hearth		Electric Furnace	
Chromium	Molybderum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs
.....	.10/.20	.....	.45c	$ 9.00	.95c	$19.00
.....	.25/.35	.....	.85	17.00	1.35	27.00
.....	.10/.20	.....	.65	13.00	1.15	23.00
.....	.10/.20	.....	.65	13.00	1.15	23.00
.....	.20/.30	.....	.75	15.00	1.25	25.00
.....	.30/.40	.....	.90	18.00	1.40	28.00
.....	.30/.40	.....	.90	18.00	1.40	28.00
.....	.40/.60	.....	1.25	25.00	1.75	35.00
.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
.40/.60	.30/.40	.....	.90	18.00	1.40	28.00
.40/.60	.30/.40	.....	1.20	24.00	1.70	34.00

of 2.70c, major basing points.

YOU NEED ALL THREE

1. MEN
2. MACHINES and
3. MATHEWS

● Your production capacity has not reached "Top" unless you are using modern material handling equipment at every possible point in your production lines.

From raw materials to the finished product, Mathews offers you a transportation system that helps create smooth-flowing, efficient production. If you need material handling equipment, remember the Mathews Engineer is always ready to serve you.

MATHEWS CONVEYER COMPANY

ELLWOOD CITY, PENNA.

Field Engineers and Sales Offices located in 30 Industrial Centers

DOUBLED CAPACITY FOR WAR PRODUCTION

Stepping up our productive capacity month after month has barely enabled us to keep pace with mounting war orders. As long as this condition exists, it becomes increasingly difficult to meet civilian requirements. Our one big job is the handling of war material. That job must come first.

not permit them to obtain their respective October, 1941, realization. The relief came in Order Nos. 6 and 7 under Maximum Price Regulation No. 120 (Bituminous Coal Delivered From Mine or Preparation Plant).

Export Licenses Revoked

• • • **The Office of Exports,** Board of Economic Warfare, announced May 30 that all general export licenses authorizing exports of machinery listed below for all destinations other than Canada and Newfoundland have been revoked. List includes:

Leather working machinery; tanning machinery; textile machinery and equipment; packaging and labeling machinery, except machinery to be used to package or label fruits or vegetables packed in hermetically sealed containers and sterilized by the use of heat, in excess of $200; pulp and paper-making machinery, in excess of $1,000; paper converting machinery, in excess of $200; printing and publishing machinery, in excess of $200; baking machinery, in excess of $200; confectionery machinery, in excess of $200; beverage bottling machinery, in excess of $200; industrial sewing machinery, in excess of $200; cotton ginning and delinting machinery; shoe manufacturing machinery; shoe repairing machinery.

Office machinery, including only the following types of new machines: accounting and bookkeeping machines; adding machines; addressing machines (including, but not limited to, embossing machinery for plates); billing and continuous forms handling typewriters; billing and other forms writing machines (except autographic registers and manifolders); calculating and computing machines; dictating machines (including, but not limited to, ink ribbon, gelatin, off-set, spirit, stencil; reproducing typewriter principle, and photographic types; but not including photostatic machines); interoffice communication systems and machines; punched card tabulating and accounting machines; shorthand writing machines; time clock stamps and time recording machines; wide carriage (18-in. or wider) typewriters with special in-built features designed for statistical or accounting work.

Revocation of general licenses to all destinations other than Canada and Newfoundland does not apply to shipments of the foregoing machinery which are on dock, on lighter, or laden aboard the exporting carrier, or shipments in transit to ports of exit pursuant to actual orders for export.

The Office of Exports will not consider future applications for export licenses on the types of machinery described above without an accompanying request for a preference rating, unless preference rating of A-9 or higher has been obtained.

Increases Denied on Cement

• • • **Freight rate increases** allowed by state or federal regulatory bodies cannot be added to the prices of cement sold on a delivered basis by cement manufacturers if the price for the delivered cement would then be above the highest prices charged in March, 1942, OPA said May 30.

In a letter sent to 85 cement manufacturers and signed by Harold Leventhal, assistant general counsel for OPA, it was explained that Section 2 of the General Maximum Price Regulation provides that the maximum price for any commodity sold on a delivered price basis cannot exceed the highest delivered price charged during March, 1942.

Export Queries Answered

• • • **OPA last week** issued an extensive question-and-answer statement designed to clear up questions raised by exporters in connection with the maximum ex-

BUY U. S. WAR BONDS

★

ALSO for Victory —keep your plant going at full capacity. Avoid frequent shutdowns. Use packings, gaskets and oil seals which give long, dependable service.

THE GARLOCK PACKING CO., PALMYRA, NEW YORK
In Canada: The Garlock Packing Co. of Canada Ltd., Montreal, Que.

GARLOCK

port price regulation. Some of the questions and answers are given below.

Meanwhile, exporters learned they are no longer required to state f.a.s. prices on export license applications. The Office of Export Control made rulings on this and several other questions about applications.

The OPA answers included:

Q.—Are sales by an American seller to its foreign subsidiary subject to the regulation?

A.—Yes.

Q.—Is the resale of a foreign subsidiary in the foreign country of goods purchased from the parent company subject to the regulation?

A.—The regulation covers sales of commodities outside the continental United States by an agent or exporter or corporation owned or controlled by the exporter within a period of two years after the date of shipment of the commodity from the continental United States.

Q.—Where an exporter performs any processing, converting, canning, or assembling of parts prior to shipment, is he to be regarded as a manufacturer?

A.—Yes.

Q.—If an exporter purchases a commodity at a maximum domestic price of $100 less 2 per cent discount for cash, is his basic price $100 or $98?

A.—It is $98 if he uses the cost of acquisition and $100 if he uses the maximum domestic price.

Q.—Where a purchasing agent takes title to the goods on behalf of the importer, what is he to use as the basic price?

A.—The supplier's basic price.

Q.—How is the premium figured?

A.—It must not exceed the average premium for the particular services or functions performed charged in the export trade on similar exports during either the period July 1 to Dec. 31, 1940, or March 1 to April 15, 1942, in whichever period this premium was lower.

Q.—Where additional overhead costs are incurred because of the rise in labor, expenses, selling, taxes, etc., over and above those existing during the base periods, may the premium be increased?

A.—No. The premium is that charged by the export trade in the base period yielding the lower premium.

Q.—Where goods have been shipped to New York for export from that port and thereafter must be diverted to another port in order to obtain shipping space, may the shipping charges from New York to the actual port of exit be added?

A.—Yes. This is a shipping charge incident to the export.

Q.—May an exporter split his premium, or in the case of an export the agent split this commission with the exporter?

A.—No, if it would result in the exporter getting a higher premium than the base period premium and consequently a higher price than that allowed by the regulation.

Rules on Advertising

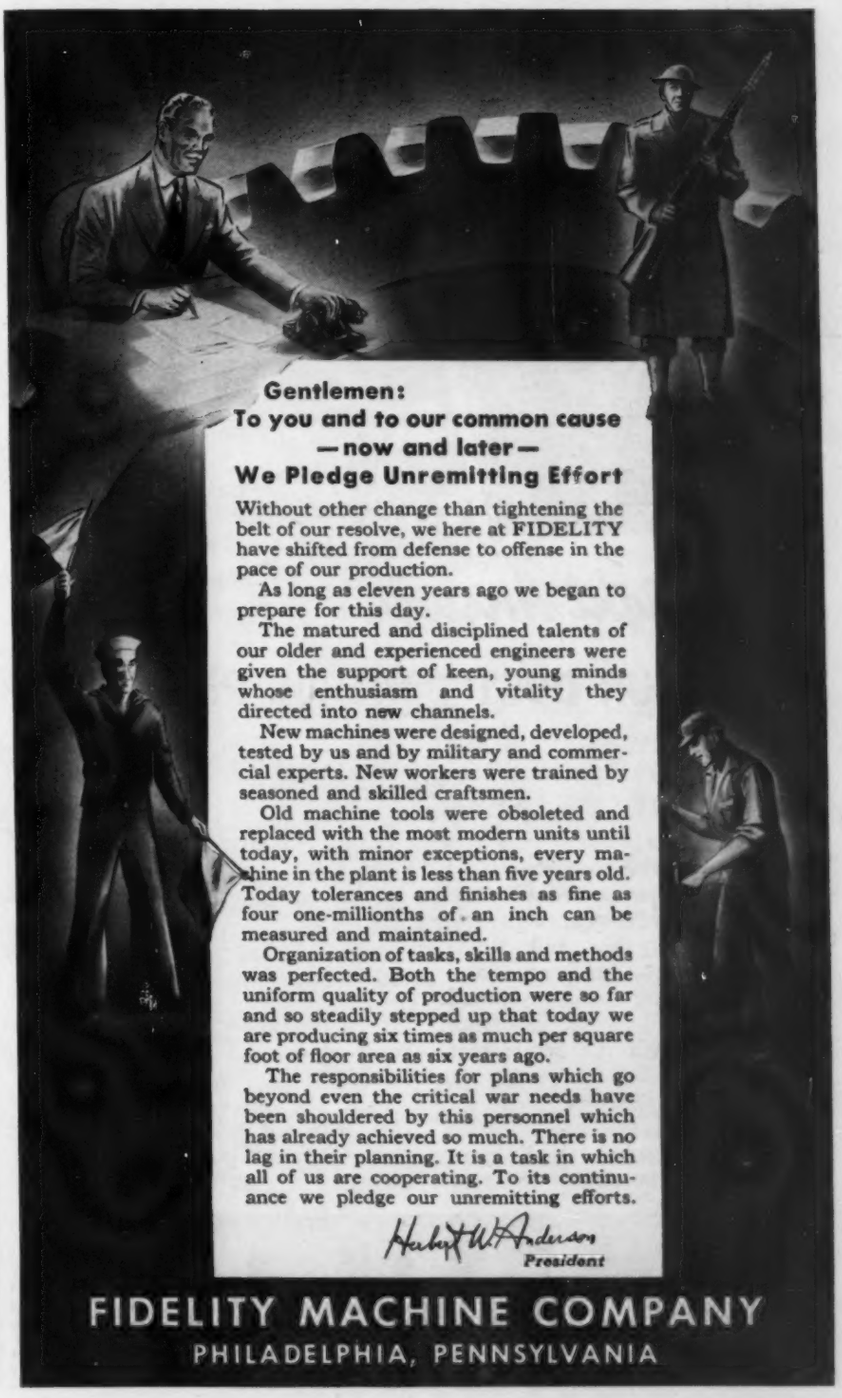
• • • **Advertising allowances** granted by a manufacturer for promotional services to a distributor or a retail outlet are not covered by the General Maximum Price Regulation, Price Administrator Henderson said May 28.

"Advertising allowances granted by a seller for promotional services rendered by a buyer are not 'frozen' by the General Maximum Price Regulation and are not to be considered as an element in the price at which goods were delivered during March, the base period under the universal price ceiling," he said. "The seller is, therefore, not required to continue to grant the advertising allowances customarily granted by him to different purchasers or classes of purchasers.

"If, however, allowances, even though designated as 'advertising allowances,' actually constituted a reduction in the price of merchandise and were granted by the seller without regard to promotional services to be rendered by the buyer, (the distributor or retail outlet) the seller is required to treat such allowances in the same way as his customary allowances, discounts and price differentials prevailing in March."

Under the price regulation, a seller may not "change his customary allowances, discounts or other price differentials unless such change results in a lower price."

Advertising allowances constitute such practices as paying by


Gentlemen:
To you and to our common cause
—now and later—
We Pledge Unremitting Effort
Without other change than tightening the belt of our resolve, we here at FIDELITY have shifted from defense to offense in the pace of our production.
As long as eleven years ago we began to prepare for this day.
The matured and disciplined talents of our older and experienced engineers were given the support of keen, young minds whose enthusiasm and vitality they directed into new channels.
New machines were designed, developed, tested by us and by military and commercial experts. New workers were trained by seasoned and skilled craftsmen.
Old machine tools were obsoleted and replaced with the most modern units until today, with minor exceptions, every machine in the plant is less than five years old. Today tolerances and finishes as fine as four one-millionths of an inch can be measured and maintained.
Organization of tasks, skills and methods was perfected. Both the tempo and the uniform quality of production were so far and so steadily stepped up that today we are producing six times as much per square foot of floor area as six years ago.
The responsibilities for plans which go beyond even the critical war needs have been shouldered by this personnel which has already achieved so much. There is no lag in their planning. It is a task in which all of us are cooperating. To its continuance we pledge our unremitting efforts.
President
FIDELITY MACHINE COMPANY
PHILADELPHIA, PENNSYLVANIA

a manufacturer, in whole or in part, the cost of a retailer's or distributor's promotional or display advertising, the cost of demonstrators or offering premiums to retailers and salesmen to push sales of new or slow moving commodities.

Gray Iron Casting Prices

• • • **In a letter** sent to sellers of gray iron castings May 27, OPA confirmed the facts stated on page 106 of this magazine last week and said:

"A maximum price regulation for gray iron castings will be issued in the near future under which maximum prices for gray iron castings will be set at a level of prices prevailing earlier than provided for in the General Maximum Price Regulation.

"You are therefore notified that any price advances made under the provision of the General Maximum Regulation will undoubtedly have to be withdrawn in the near future; also, that it is contemplated that the proposed regulation will cut across existing contracts."

Steel Warehouse Prices

• • • **In Tacoma and** Sioux Falls, which were added to Price Schedule 49 last week as listed cities, warehouses specified are: Sioux Falls, Hassensteel Steel Corp. and Sioux Steel Co.; Tacoma, Hunt & Mottet Co.

Discount on Wire Set

• • • **Amendment No. 5** to the steel mill price schedule, No. 6, provides that the minimum discount which producers can extend is 40c. per 100 lb. off the base price for bale tie low carbon Bessemer or low carbon basic manufacturers' wire, except in cases where a lesser discount was customarily and actually granted as of April 16, 1941, by a producer who customarily sold bale tie wire to bale tie manufacturers.

Fabricated Aluminum Prices

• • • **Reductions in** prices of fabricated aluminum products previously scheduled by the OPA to take effect June 15, have been postponed until July 1. Deferment of the effective date of the reductions was decided upon to allow additional time for the industry to make adjustments to the new price level.

Central May Sell at $2.20

• • • **Central Iron & Steel Co.,** Harrisburg, may sell plain steel plates, base grade, at a maximum price of $2.20 per 100 lb., f.o.b. established basing point system, according to a clarifying statement issued by OPA on May 28. It was explained that a "clerical error" by OPA about ten days ago resulted in revoking entirely the exception previously granted Central rather than merely modifying it downward.

The steel company had been

THE Right Answer

TO YOUR DUST CONTROL PROBLEM

Compare the "Dustube" point-by-point and you will see how logically it meets your dust collecting requirements.

It is *Simple:* The cloth tubes can be installed, inspected or removed in a jiffy; they are light and economical to ship and store; they prevent bridging and clogging; being amply spaced they greatly decrease resistance to air flow with the result that there is not only a saving in power but the air velocity throughout the collector is more uniform; the tubes clean more rapidly and thoroughly because they are shaken like a rug while limp and deflated.

It is *Economical:* Operating and maintenance costs are confined to power for operating the fan and shaker and the occasional replacement of an inexpensive cloth tube. There are few working parts to wear.

It is *Efficient:* Performance records show that its efficiency by weight is 98% and more; by dust count the discharged air shows less than ten million particles per cubic foot of air from two to ten microns in size.

AMERICAN
FOUNDRY EQUIPMENT CO.
510 S. BYRKIT ST. MISHAWAKA, IND.

given permission to charge $2.35 starting about a year ago. The OPA decision to scale down the premium was reported in last week's issue of this magazine, page 106. Instead of being forced back to $2.10, Central may charge $2.20.

Nonferrous Foundries Aided

• • • **Exceptions issued** last week to the nonferrous casting price schedule (No. 125) grant Millinocket Foundry & Machine Co., Millinocket, Me., permission to sell to the Great Northern Paper Co. bronze castings at 24½c. per lb. and special bronze castings at 27¼c. per lb. Permission was given George E. Crompton, doing business as the New Bedford Brass Foundry, New Bedford, Mass., to sell to certain purchasers in Massachusetts specified castings at 30c. to 38c. per lb. Permission was given Prairie Brass & Metal Co., Kansas City, to sell to certain purchasers specified castings at varied prices.

Formula Established for Prices of More Castings

Washington

• • • **Producers of malleable iron** and high alloy steel castings were given price formulas on Tuesday by OPA for established maximum prices for such castings which can not be priced under Section 1499.2 of the General Maximum Price Regulation. The formulas are contained in Orders No. 4 and 5 for malleable iron castings and high alloy steel castings respectively under Section 1499.3 (b) of the GMPR, effective June 2.

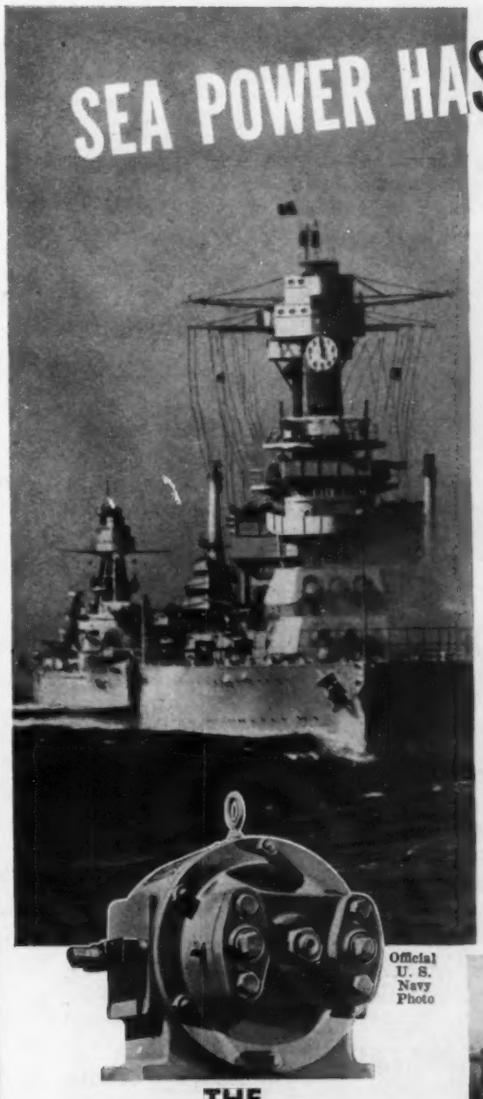
The text of the formula for both types of castings follows:

"The producer's maximum price for each such casting shall be a net price (after adjustment for all applicable customary extra charges, discounts, or other allowances) not in excess of that at which he would have sold such a casting during March, 1942, under the pricing formula or method of calculating prices used by him in March, 1942, employing the same cast factors (wage rates, price of materials, and overhead) and profit margins which were in effect for him in March, 1942, even though his cost or profit margin may have increased since that date."

Warns Against Abuses

• • • **Asserting that** "in times like these even a private business is a public trust," David Ginsburg, general counsel of OPA, told the National Association of Purchasing Agents at New York that gross abuse of price control laws can be severely dealt with by OPA.

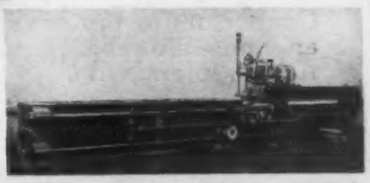
He pointed out that issuance of licenses is a "simple and painless process" and that suspension of license, taking away the right to do business, can also be speedily accomplished. "License suspension suits," he said, "Are the impeachment proceedings by which we remove from positions of economic responsibility those who have shown themselves unworthy of further confidence."



Official U. S. Navy Photo

Hele-Shaw Fluid Power is also making good at new jobs

Machines have to make good at new jobs today. Hele-Shaw Fluid Power is helping them. Fluid Power is oil under pressure from a Hele-Shaw Pump. It powers many kinds of hydraulically operated machines and devices. Each Hele-Shaw pump is normally designed for a certain maximum pressure. A hydraulic press, for example, that is driven by a Hele-Shaw pump at a pressure of 2000 lbs. per sq. in. today, may tomorrow have to work at 3000 pounds pressure on a war job. Various types of Hele-Shaw pump controls make the changeover a work of a few minutes. The ease of selecting the right pressure for a job is an advantage of Fluid Power Operation. There are others our illustrated catalog is waiting to show you. Why not send for it?



Steeping press for the cellophane industry uses Hele-Shaw Pump with a hand-operated Hele-Shaw GAM Control. Control regulates volume and pressure independently, eliminating need for auxiliary operating valves.

THE **Hele-Shaw** *Fluid Power Pump*

OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, LO-HED HOISTS

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

PRP Plan Is Broadened to Include More Metal Users

• • • **Moving further** toward a strict allocation of scarce materials and improved control of inventories, J. S. Knowlson, WPB Director of Industry Operations, said that all but a few classes of companies requiring more than $5,000 worth of metal for third quarter must apply before July 1 for priority aid under the Production Requirements Plan. By revision of Priorities Regulation No. 3, to be issued within a few days, the present number of 6300 companies now using the PRP plan will be increased to 10,000.

Major metal using plants affected by the revised regulations will not be permitted to use any preference rating except ratings assigned to them by PRP during third quarter. They will not be allowed to accept delivery of any scarce metal in excess of a quota established for them.

"It is anticipated," said Mr. Knowlson, "that only the following classes of companies which will use more than $5,000 worth of metal in third quarter will continue under existing procedures instead of under PRP: Producers engaged in primary production of basic metals; distributors; wholesalers; builders; companies engaged in transportation; utilities including light, heat, water and gas companies; mining companies and petroleum enterprises; communications including telephone and telegraph; companies engaged in sewage and drainage operations."

All large metal users are required to report their consumption to WPB on form PD-275. Those affected by the revision of Priorities Regulation No. 3 may use exactly the same information in filling out PRP application form PD-25-a, adding the other information called for.

AMPCO CASE HISTORIES

Photo by U. S. Army Signal Corps.

IN pre-defense days, a prominent manufacturer of steel mill machinery—now a government contractor making anti-aircraft gun mounts! The transition to wartime activities did not disrupt their need for high quality bronzes. Instead of heavy screwdown nuts of Ampco Metal, the orders now call for high tensile strength bronze parts, suitable for gun carriages. At the Ampco foundries they can still secure just the alloys they need, exactly cast to rigid government specifications.

As old customers assume war contracts, they change their patterns and specifications—but continue to secure bronzes of controlled analysis from the same reliable source.

Contractors to the government, needing bronze alloys, are invited to submit their problems to Ampco engineers. Ask for information.

AMPCO METAL, INC.
DEPARTMENT 1A-6 MILWAUKEE, WISCONSIN

AMPCO METAL
AMPCO
THE METAL WITHOUT AN EQUAL

"M" and "L" Order Appeals Made Uniform By WPB

• • • **A uniform appeals** policy to be followed in consideration of all appeals for relief from M and L orders was officially announced on Monday by WPB. It governs decisions on appeals to assemble processed or semi-processed inventories beyond cutoff dates in excess of limitation quotas.

In general appeals will not be granted except when the materials involved have already been fabricated to such an extent that their use as scrap would be wasteful. The granting of appeals will be considered only after it has been determined that no other adequate relief is available to the applicant.

The principal grounds set up are as follows:

The processed inventory must be without salvage or reclaimed value to war production, and if not assembled must

WPB Asks Complete Data on PD-1-a Forms

• • • While there is no assurance that any application filed on form PD-1-a will receive approval, WPB announced that only persons giving full information required on the form will have applications processed. An appeal for more efficient treatment of PD-1-a applications was directed to persons using this form of application for materials and supplies. Much delay and difficulty has been experienced in attempting to appraise PD-1-a applications because of the sketchy information submitted.

Detailed information on the function of equipment desired to be purchased and whether it would repair, replace, or expand existing facilities; and a complete description of the material wanted with the name of the prospective supplier are particularly important items on the form.

have small scrap value compared to the worth of the completed item. The appellant must not be in violation of existing conservation, limitation or priority orders.

The appellant must not have purposely processed a large inventory with the view of requiring preferential treatment or have otherwise violated the spirit of the order.

Consideration will be given if granting the appeal will help finance conversion to war work or if this is not the case will relieve the appellant's financial stress and in no way interfere with the war effort.

Granting the appeal must not give the appellant any substantial advantage over competitors in a like situation. No permission will be granted to use or procure materials which are scarce, such as nickel and tungsten except, when the amount is extremely small and the article manufactured will have an unusually large value to the national economy.

One spokesman said appeals will be granted only if successful prosecution of the war is furthered thereby.

Relief available in many cases without granting an appeal from the terms of a WPB order includes assistance in disposing of frozen inventories materials to other companies permitted to use them or to government agencies; resale to the source of supply; assistance in securing war orders or in conversion of facilities to direct war production; advice on obtaining financial assistance from the Bureau of Finance in the Bureau of Industry Operations, and assistance in disposing of idle production equipment.

Refrigerators

• • • The disposition procedure for some 600,000 refrigerators now frozen in the hands of manufacturers and distributers was set up by order L-5-d, effective June 15. It supersedes the original freeze order L-5-b, and permits the sale of new domestic mechanical refrigerators to Army, Navy, Maritime Commission, Panama Canal, or upon a certificate of transfer issued by the WPB. These certificates are expected to be issued only on approval of the National Housing Agency for war housing, the U. S. Public Health Service, Board of Economic Warfare for South American export, Lend-Lease, and the Treasury Procurement Division. In addition, the units may be sold to the

Immediate Delivery on "AIRGRIP" Highspeed Revolving Air Cylinders

"AIRGRIP" Model "D" Air Cylinders (shown above) are in greatly accelerated production, and are now available for *immediate shipment.*

These *high speed,* revolving air cylinders *have double ball bearings; require no normal adjustments; have balanced air pressure—no end thrust;* and, *are specially constructed for long life and low maintenance.*

"AIRGRIP" Shell Holding Equipment

"AIRGRIP" air operated chucking devices also include—universal three jaw chucks —shell holding equipment—air filter reducing valve and automatic lubricator units—and, operating valves.

Wire, or phone, your requirements today!

AIRGRIP CHUCK
DIVISION OF
ANKER-HOLTH MANUFACTURING CO.
"Headquarters for Shell Holding Equipment"
332 South Michigan Avenue • Chicago, Illinois

Defense Supplies Corp., or any other RFC agency.

Car Exception

• • • **Regardless of** restrictions on deliveries of iron and steel products contained in General Preference Rating Order M-21, equipment used in the construction or repair of railroad cars may be sold between producers or suppliers of materials. A ruling to this effect was made last Thursday by WPB in Amendment No. 2 to Supplementary Limitation Order L-97-a-1. The amendment is intended to clear up questions relating to the possible effect of M-21, which restricts deliveries of iron and steel products, upon sales of car parts on unrated orders, inasmuch as L-97-a-1 canceled preference ratings for deliveries of materials going into the manufacture of these parts.

WPB's Division of Industry Operations said that purchasers of such parts must endorse a statement to sellers that material acquired will be used only in the construction or repair of railroad cars.

Steel Form Ruling

• • • **In making** a correction in a release of May 4, WPB's Division of Industry Operations last Thursday said that producers of iron and steel products on Schedule B of Order M-21-b must file form PD-83-f quarterly with the WPB, and warehouses must report to the Bureau of Census on form PD-83 before the fifteenth of each month with respect to products on Schedule A. Previously the Division stated the requirements of Amendment No. 4 as calling upon warehouses to report to the Bureau of Census on or before the fifteenth of each month on form PD-83 in regard to Schedule A products and to the WPB on form PD-83-f for Schedule B products.

The sentence as corrected reads as follows:

"Warehouses must report to the Bureau of Census on or before the fifteenth of each month on Form PD-83 in regard to Schedule A products. *Producers must report to the War Production Board, quarterly,* on Form PD-83-f for Schedule B products."

Warehouse-Producer Reports

• • • **Producers of iron** and steel products on schedule B of order M-21-b must file form PD-83-f quarterly with the WPB, and warehouses must report to the Bureau of Census on form PD-83 before the 15th of each month, with respect to products on schedule A. according to a correction of amendment No. 4 to order M-21-b, issued May 4. The original amendment did not include the producers report on form PD-83-f for schedule B products.

Industrial Machinery

• • • **A clarification** of order L-83 in amendment 1 so that certain types of machinery covered by the

AGAIN ROCKWELL ENGINEERS BOOST WAR PRODUCTION!

A new Rockwell Gas Fired Unit hardens, quenches and tempers high explosive shells in one continuous operation. A single operator places shells on the conveyor at the charge end of the hardening furnace — thereafter all operations are continuous. Both the hardening and draw furnaces are provided with automatic proportioning burners and control instruments so that any draw specified by the Ordnance Department may be easily obtained.

Shells are carried through both furnaces by an oil hydraulic pushing system with time cycle control. The method of quenching gives a very uniform hardness and minimizes any danger of soft spots due to vapor pockets or other causes.

If MORE PRODUCTION is your problem, write or wire us. Rockwell's wide experience in heat treating will help you.

ROCKWELL
ELECTRIC AND FUEL FIRED
FURNACES

W. S. ROCKWELL COMPANY
50 Church St. New York

order will not be confused with small household types regulated by other WPB orders. The amendment stipulates that coffee grinding and food slicing and grinding machinery covered in the order means machinery of 1 hp. or over. Small machinery for these purposes are covered by order L-65.

↓ ↓

Sump Pumps

• • • **Simplification in design** of electric cellar drainers to save copper and alloys was ordered by WPB. Known in the trade as sump pumps, the simplification schedule (No. 10) to order L-42, prohibits the use of copper and copper base alloys in certain parts of the units. No brass or copper tubing shall be used in the pump standard; no copper or copper base alloys may be used in the upper and lower parts of the impeller housing and pump base, the float rod assembly, the float, or the impeller; and the metallic cover shall be eliminated.

↓ ↓

Canned Foods

• • • **The canned foods** order, M-86-a, was amended to assure that grade preference of fruit and vegetable packs in 1942 for military and Lend-Lease consumption takes precedence over the can-size preference. Also, several changes were made in the description and grade preferences of fruits and vegetables which may be packed for military use. It is preferred that most fruits and vegetables be packed in a No. 10 can, holding three-quarters of a gallon, with the second can-size preference being the No. 2½ can, and the third preference a No. 2 can. Canners packing in 1941 any products listed in Table II of the order, which was not packed in 1940, shall report quantities packed on form PD-342, the canners' production report for 1940 and 1941. Also, the seasonal pack report for 1942 should be filed on form PD-343.

↓ ↓

Suppliers' Inventories

• • • **Dealers affected** by order L-63, the Suppliers' Inventory Limitation order, may base their calculations on their sales during the preceding quarter, rather than on the second preceding month. Amendment No. 3 to the order effects this change, which is optional. A dealer in the eastern or central war time zones may carry stocks of the 19 controlled categories of merchandise equal to two-thirds of the dollar volume of such goods sold during the preceding three months. Dealers in other time zones may maintain inventories equaling the dollar value of the sales during the full period of the previous quarter.

↓ ↓

Plumbing Supplies

• • • **WPB issued** schedule 12 to limitation order L-42, prohibiting after June 20 the use of metals other than joining hardware, coating, or reenforcing mesh in a list

STRONG · CLEAN

CASTINGS SAVE MONEY

Strong takes the same well earned pride in its cleaning operations that it has for its annealing facilities. In addition to the cutting, grinding and chipping processes, Strong operates two sandblasts with the larger one capable of handling any casting which comes from its 15 by 19 annealing furnace.

All of which adds up to a standard of castings which are much easier to machine—because the steel making, the molding, the annealing and the cleaning are all handled by Strong quality controls that safeguard the buyer's interest at all stages of the work. The surest way to have stronger castings is to have them Strong-cast!

STRONG STEEL FOUNDRY COMPANY, BUFFALO, N. Y.

STRONG

TENSILE STRENGTH · ELONGATION

of plumbing fixtures common in the home and commercial establishments.

Except for specified items, the schedule bars the use of metal in the manufacture of plumbing fixtures, but permits iron and steel to be used in some listed instances. The production of the following plumbing fixtures will be halted: Sinks (except scullery), sink and laundry tray combinations, foot baths, drinking and wash fountains, water closet bowls, frost closets or hoppers and tanks for water closets or urinals (other than pressure tanks for frost-proof closets).

Sheet Steel

• • • **Reserve allotments** of steel sheets for fabrication into steel drums for export shipment have been made by amendment 2 to order M-45. Both hot and cold rolled sheet tonnages have been ordered set aside by the producer for the specific purpose of drum manufacture. The original order covered hot rolled sheets only.

Power and Steam Equipment

• • • **A clarification** of order L-117, which restricts production, sale and delivery of heavy power and steam equipment points out that the original order was not intended to include equipment manufactured solely for marine use.

PRP and Trucks

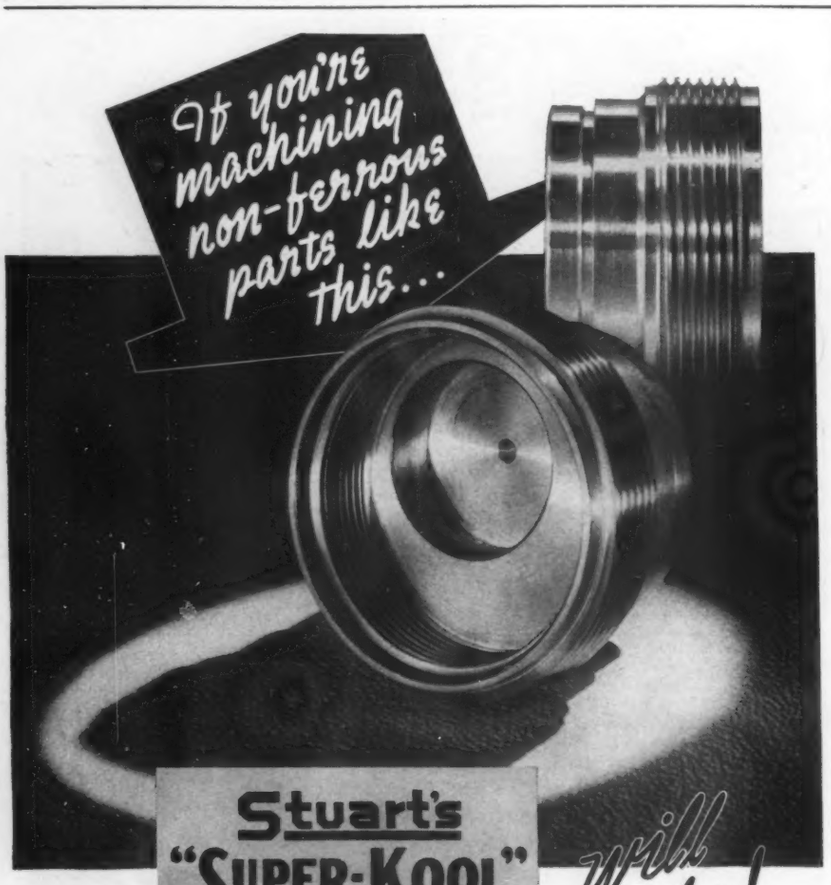
• • • **No deliveries of** materials can be made on A-3 ratings to manufacturers of buses and truck trailers, and bodies and cabs for medium and heavy trucks unless the producer, prior to June 1, has filed an application for assistance under the Production Requirements Plan, according to amendment 4 extension 6 of order P-54. The order is also extended until June 30. The rating may be used by a producer or a supplier, but cannot be used to obtain deliveries of materials on purchase orders placed after July 1 or on purchase orders calling for deliveries after July 31.

Toluol and Xylol

• • • **To increase** production of aviation gasoline and nitration-grade toluol, WPB limited delivery of aromatic petroleum solvents for use in paint and other protective coatings to orders bearing high ratings. The order, M-150, will divert more than half of the toluol and xylol produced from the protective coating field into the production of aviation gasoline and nitration-toluol, used in explosive manufacture.

Strategic Mica

• • • **Use of strategic mica** in products for the Army and Navy is made subject to complete WPB control by an amendment to order M-101. No such mica may be used in any product for the Army and Navy which is not an implement of war after June 1, and



IN the production of brass and aluminum fuses the reduction of "down time" to the least possible degree is all important!

Cutting operations on multi-spindle automatics, such as reaming, eccentric drilling, tapping and threading, respond to the application of Stuarts "Super-Kool" No. 151 Brass Cutting Oil, or Stuarts "Super-Kool" No. 1M Aluminum Cutting Oil frequently with a surprising improvement in tool life and finish.

For All Cutting Fluid Problems
D. A. STUART OIL CO.
Chicago, U.S.A. • LIMITED • Est. 1865
Warehouses in All Principal Metal Working Centers

none may be used in any product after July 1 except by specific authorization. Monthly reports of inventories are required of all stocks. Strategic mica is defined as muscovite or phlogopite block mica of a quality better than heavy stained, and is not to be confused with ordinary mica "splittings."

Armor Piercing Shot

• • • **To stop over-buying** and to reduce excessive inventories, WPB placed steel for 90-mm. armor-piercing and semi-armor-piercing shot under complete allocation. This special type of steel, which calls for unusual hardening and extra time of manufacture, was added to others under allocation in order M-21-f, issued Feb. 17.

Plumbing, Heating Equipment

• • • **Restrictions imposed** on the sale of plumbing and heating equipment by order L-79 were relaxed by removing the ban on equipment necessary for civilian needs. The sale to householders is permitted of cooking and heating stoves and water heaters where no other equipment for these purposes is available, and the conversion of oil and gas burning equipment to the use of coal is aided by permitting the sale and delivery of equipment needed to convert such burners. Other provisions permit a wider sale of similar items for civilian use.

Firearms

• • • **Small-gage shotguns,** odd-caliber and certain .22-caliber rifles, as well as other specified types of firearms not needed by the armed forces were released for general sale to the public by an amendment to L-60.

Warehouse Sales

• • • **An easing** up of restrictions on warehouse sales of certain steel products was forthcoming this week when WPB amended orders M-21 and M-21-b to permit the sale on unrated orders of fence and barbed wire, poultry netting, fence posts, gates, staples and corrugated roofing and siding. These items are added to nails, bale ties and small pipe, on which no ratings are now necessary for sales from warehouses or dealers.

The amendments also give the warehouse an option in basing their quarterly wire and wire products requirements. They may either base them on deliveries from the producer to warehouse stocks during the corresponding calendar quarter in the July 1, 1940, to June 30, 1941, period, or on 25 per cent of the total annual tonnage delivered during the base period.

Industrial Equipment

• • • **General industrial** equipment such as elevators, electric motors of more than 1 hp., indus-

WE'LL RUSH YOU A WELLS SAW

TO HELP SPEED YOUR PRODUCTION !

We can send a fast, accurate Wells Saw . . . "Rush Delivery." Quickly installed in your plant, it will soon be at work increasing your production capacity . . . stepping up metal cutting time!

The Wells Metal Cutting Band Saw, an all-around tool for production, tool room or maintenance work gets results — quickly! These precision-built units handle almost all metals in a variety of shapes.

Rugged Wells Saws meet all government specifications. A large stock of blades always available. Wire, write or phone direct or to your mill supply dealer.

WELLS MANUFACTURING CORP., THREE RIVERS, MICH.

WELLS METAL CUTTING BAND SAWS

trial fans, compressors, and pumps was placed under distribution control by order L-123. Manufacturers of such equipment may ship to distributers only to fill approved orders actually received by distributers or to replace machinery delivered on an approved order. The restrictions on the 14 classes of equipment specified do not include repair parts worth less than $1,000 for use in maintaining a single piece of equipment or repair parts worth more than $1,000 in case of actual breakdown.

↓ ↓

Instruments and Controls

• • • **Instruments, regulators** and control valves used in general industrial processing were placed under production and distribution control by order L-134 to conserve nickel, chromium and their alloys. The size and maximum chromium and nickel alloy content of certain of the 28 specific items listed are controlled, and under the general restrictions, manufacturers are p r o h i b i t e d from processing any chromium, nickel or alloys in any instrument parts except for use under operating conditions specified. Thirty days after May 26, manufacturers may not deliver any parts except for specified uses, and, effective immediately, they cannot deliver these instrument parts except on a rating of A-10 or higher. The order does not apply to any instruments which do not contain nickel, chromium, or their alloys, or i n s t r u m e n t s manufactured prior to May 26.

2 OR 3 MEN IN YOUR PLANT . . . . Need This Manual!

When you're cleaning metals for war machines and war equipment, peace time methods are too slow, too ineffective and too uncertain.

Here's a handbook of ideas on the handling of this vital problem at war rates of speed and war standards of perfection. It covers—

MAGNUS EMULSO-SPRAY AND EMULSO-DIP

the new method of cleaning a great many metal parts and objects faster, better and at lower cost than by vapor degreasing. Harmless to all metals—and tackles dirts that do not respond to solvent degreasing.

OTHER MAGNUS METAL CLEANERS

for specific metal cleaning problems such as cleaning die-cast aluminum alloy parts; shell cases; fuse parts and the like. The handbook covers all phases of metal cleaning and suggests the methods and materials best suited to effective and dependable war production.

MAGNUS METAL WASHING MACHINES

The standard and special machines which the Magnus Machine Division is ready to build to meet your production requirements are covered in detail, including the new units for the most effective use of Magnus Emulso-Dip and Emulso-Spray.

SEND THEIR NAMES IN NOW!

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

46 South Avenue Garwood, N. J.

MAGNUS CLEANERS

Transportation Rulings

Ore Shipments Take Precedence Over Coal

• • • **To insure the** maximum capacity for the transportation of iron ore, the Office of Defense Transportation has issued an order prohibiting certain Great Lakes coal movements. The coal order, general order No. 9, effective June 1, forbids unauthorized carriers to move coal from any Lake Erie port to: (1) Any port on the Detroit and St. Clair rivers south of and including Port Huron; (2) the Chicago area; (3) any port on Lake Erie and Lake Ontario, and connecting or tributary waters.

A general permit allows vessels of the self-unloading type to move coal to: (1) Any Canadian port on Lake Erie, Lake Ontario, or on the Welland Canal; (2) any port on the Detroit and St. Clair Rivers; and (3) any port in the Chicago area. This type vessel, of which there are 37 under United States registry, has belt-conveyor devices for unloading and is unsuitable for ore transportation.

The order prohibits railroads from accepting or handling coal destined for Lake Erie transshipment except as provided for in the general permit or by special authorizations.

↓ ↓

ODT Field Managers

• • • **Field managers** in ODT's division of motor transport were announced for 13 districts, increas-

ing to 38 the number of such appointments.

The new appointments were:

Albany, N. Y., Lawrence F. McDonald, East Greenbush, N. Y. Former traffic manager of the American Meter Co., Albany.

Buffalo, N. Y., Floyd B. Piper, Buffalo. Former general manager of Direct-Winters Transport, Ltd. Charlotte, N. C., LaFayette R. Stallings, Rocky Mount, N. C. Former partner and general supervisor of Stallings Transfer Service.

Chicago, Ill., Harry L. Gormley, New Castle, Pa. Former secretary-treasurer and operating manager of the Keystone Lawrence Transfer & Storage Co., New Castle.

Cincinnati, O., Henry A. Leachman, Ft. Thomas, Ky. Former assistant traffic manager of the Continental Freight Forwarding Co.

Cleveland, O., C. R. Allen, Cleveland. Former superintendent of trucks for the Auto Haulaway Co.

Des Moines, Iowa, John H. Gillespie, Des Moines. Former secretary of the Iowa Motor Carriers Association.

Houston, Texas, J. R. Quattlebaum, Nacogdoches, Texas. Former highway insurance investigator.

Minneapolis, Minn., Frank T. Corcoran, St. Paul. Former official of the Minnesota State Department of Highways.

Pittsburgh, Charles T. Walker, Cincinnati. Former assistant general freight agent for the Inter State System, Grand Rapids, Mich.

San Antonio, Texas, John G. Ross, Austin. Former inspector of law enforcement, chief clerk of the motor transport division and junior examiner for the Railroad Commission of Texas.

Shreveport, La., John F. Dawson, Baton Rouge, La. Former assistant chief of the motor transportation division of the Louisiana Public Service Commission.

Toledo, O., H. Martin Walker, Toledo. Former terminal manager of the Long Transfer Co.

Trucking Orders Amended

• • • **Major changes** affecting trucking operations were made in ODT general orders 3, 4, 5, and 6. The effective date of the provisions of orders 3, 4, and 5, prohibiting the operation of trucks in over-the-road deliveries unless loaded to 75 per cent of capacity on the return trip has been postponed from June 1 to July 1. The provision of order No. 6, regarding newspaper deliveries, has been relaxed to the extent that two alternate plans for conservation of trucks in delivery services are available. Jurisdiction has been extended on the local delivery order to 25 miles beyond the corporate limits of the municipalities. Trucks engaged exclusively in the pick-up or delivery of telegraphic, radio, and cable communications and the United States mails have been exempted from the provisions of order No. 6, and this order has also been relaxed with respect to coal trucks. July 1 has been set aside as the effective date of the mileage reduction program for such vehicles. Trucks engaged primarily for the transportation of bulk liquids, covered in order No. 6, will come under the control of this order on July 1 instead of the effective date now shown in the order.

"Every Operation in the War Depends on Steel"

So said President Roosevelt in addressing the Steel Workers' Organizing Committee.

"In our war against the Axis powers we are now approaching the maximum of steel output and must reach that goal at the earliest possible moment and keep it until success is ours," the President declared.

"Every operation in the war, whether by the Army, the Navy or in the all-important field of transportation, depends on steel.

"EVERY DAY LOST IN PRODUCTION WILL PROLONG THE STRUGGLE AND DELAY VICTORY."

President Roosevelt was talking about labor, but what he said applies equally to iron and steel scrap, which is as essential as man-hours in the successful prosecution of the war.

Are you doing all that lies within your powers to increase the flow of scrap to steel mills, blast furnaces and foundries?

The CHARLES DREIFUS Company

(Brokers in Iron and Steel Scrap for 40 years)

Philadelphia, Pa.
Widener Bldg.,
Rittenhouse 7750

Pittsburgh, Pa.
Oliver Bldg.
Atlantic 1856

Worcester, Mass.
Park Bldg.
Worcester 6-2535

PRIORITIES

PRP Setup Given Canadian Customers

Toronto

• • • **New regulations** have been issued in Canada which govern priorities under the Production Requirements Plan. In this connection the Steel Co. of Canada, Ltd., has forwarded a letter to its customers which points out that materials of United States origin which are necessary for the company's operations will be allotted to it under the terms of the PRP plan, as laid down by the War Production Board. The company must periodically supply the required information which will clearly relate the importance of its manufacturing activities to the war program, and to essential civilian needs, and which will govern the priority assistance granted by the company. The original information must come from the customers of the steel producers.

As a consequence of the above, and commencing June 1, 1942, the steel companies ask customers to add to all orders the information outlined below, so that the company may fill orders with the least possible delay and inconvenience.

Customers who are prime contractors for the Department of Munitions and Supply, or other government agencies must provide:

1. (a) An official PD-3A or PD-1A preference rating certification, or
(b) An official certification from any other type of preference rating order, or
(c) A Wartime Industries Control Board designation order.
2. The ultimate or "end use" of the materials or products which are ordered.

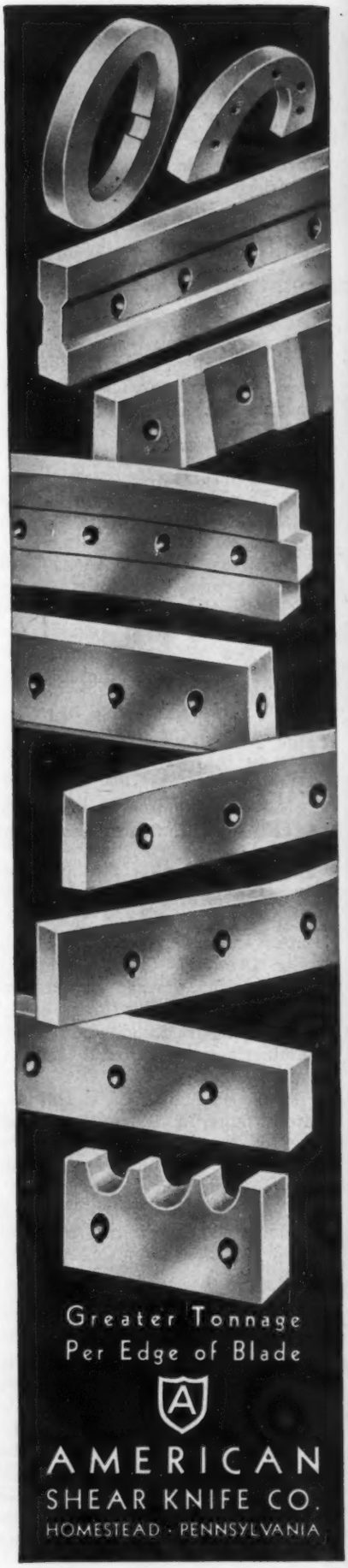
Customers who are sub-contractors, jobbers, etc., must provide:

1. (a) An official certification as described in 1. (a) or 1. (b) above, which has been obtained from the prime contractors, or
(b) The Wartime Industries Control Board designation number under which the buyer or the prime contractor may be operating, or
(c) The ultimate or "end use" of the materials or products which are ordered.

The list of end uses is attached, which should be used as a guide. This information must be typed on the face of each purchase order, or on an attached sheet. Separate orders must be issued for each priority rating, and for orders to which a preference rating cannot be assigned.

The instructions have no connection with the use of form S.C. 1000, which is still required for the products which it covers.

End use classification are as follows: Military: aircraft, ships, vehicles, arma-



ment and weapons, ammunition, war equipment and supplies not otherwise classified, war facilities, such as air fields, bases, camps, forts, navy yards, etc.

Industrial and civilian: Production and processing of raw materials, such as metals, chemicals, etc.; power light and heat; transportation; communications; public health and safety; agricultural equipment and supplies; industrial food processing; equipment and supplies for household use; education and recreation; equipment and supplies for office use; machinery and equipment for industrial use; construction of new buildings; operating supplies and building repairs and maintenance. All other end uses.

George C. Heikes Named Chief of WPB Zinc Branch

Washington

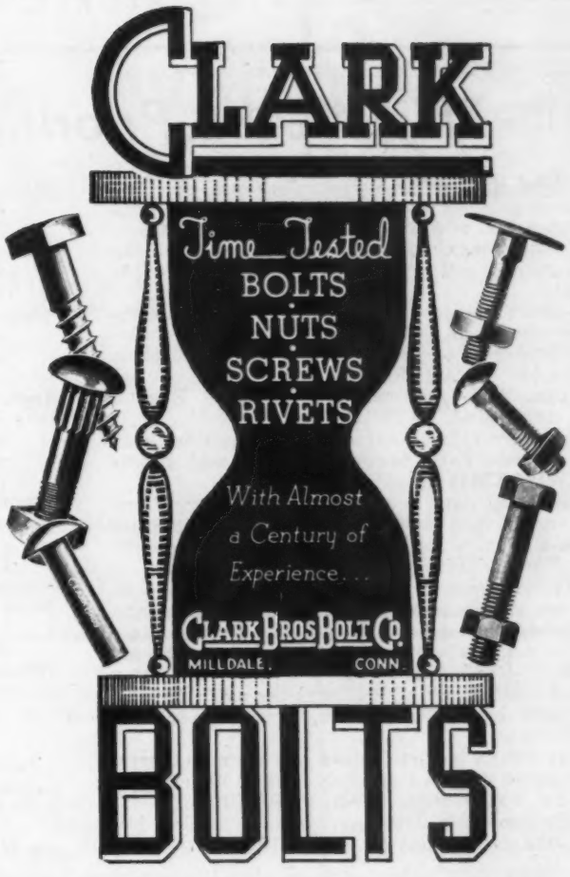
• • • **George C. Heikes** has been appointed chief of the WPB Zinc Branch. Mr. Heikes replaces David Uebelacker, who has been recalled by his firm, Ford, Bacon & Davis, New York. The latter has been connected with the war effort since November, 1940, was formerly chief of the copper, zinc branch and took over the zinc branch when the two were separated. He is an engineer and will resume war engineering duties with his firm. Mr. Heikes is now a resident of Washington and is a government employee. He is a graduate of Lehigh University and has been a mining engineer and geologist for many years and formerly was with the National Lead Co. Mr. Heikes joined the war effort in the fall of 1940 as assistant chief of the copper, zinc branch.

WPB Legal Division Makes Several Changes in Staff

Washington

• • • **John Lord O'Brian,** general counsel of the WPB, has announced several organizational and staff changes in the legal division, including appointment of Milton Katz, who has been assistant general counsel in charge of industry operations and priorities, as solicitor of the WPB. He will be responsible for activities in connection with overall legal policy. Mr. Katz was formerly professor of law at Harvard University.

Manly Fleischmann, formerly principal attorney for the bureau of priorities, becomes an assistant general counsel and will supervise all priorities legal matters, including enforcement. Fleischmann was formerly in private practice in Buffalo.



MARVEL SAWS

LOW COST—HIGH SPEED

MARVEL

MARVEL 4-B shaper action high speed Hack Saw.
Screw-feed. Ball-bearing saw frame.
Quickaction vise.
Cuts 6" cold-rolled bar in 8 minutes —other sizes in proportionate time.

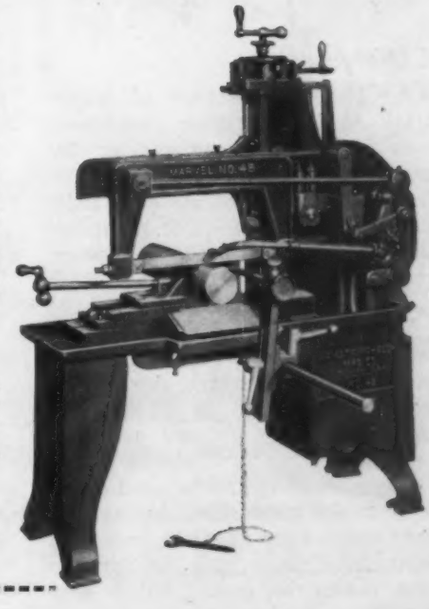
MARVEL

The performance of MARVEL 4-B is high speed cutting with low cost operation because it will out-cut any other saw in its price class. Has draw-cut and lift return giving blade longer life. Has accurate, rigid frame action. 6" x 6" capacity and a speed of 149 strokes per minute. MARVEL 4-B may be had with cabinet base and with 4 speeds.

BUY FROM YOUR LOCAL DISTRIBUTORS

Write for Bulletin about these low cost machines featuring speed and efficiency.

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave.
Chicago, U.S.A.
Eastern Sales Office:
225 Lafayette St., New York



This Week's Priorities and Prices

Canner's prices of hermetically sealed, canned, or glass-packed vegetables established by maximum price regulation 152, effective May 25. (OPA-PM3439)

Gray iron casting maximum price regulations are being drawn up and will be made public shortly. (OPA-PM3451)

Petroleum products discounts permitted buyers on comparable sales from Oct. 1 to 15, 1941, must be maintained, according to amendment 17 to revised price schedule 88. (OPA-PM3452)

Dallas, Texas, WPB regional director, Ross Eugene Risser, announced. (WPB1226)

Instruments, valves, and regulators production controlled by order L-134 to conserve nickel and chromium. (WPB-T365)

NE steel technical data is available to industry from Metallurgical Section of the WPB Iron and Steel Branch, and from the Bureau of Industrial Conservation. (WPB-T369)

Steel distribution centers for iron and steel products sold from warehouses were announced in amendment 4 to revised price schedule 49, effective May 26. The centers are Tacoma, Wash., and Sioux Falls, S. D. (OPA-PM3440)

Salmon and sardine pack of 1942 was set aside for the government by order M-86-b, issued May 26. (WPB1218)

Refrigerators frozen in distributors and manufacturers hands may be disposed of after June 15 under conditions set up by order L-5-d. (WPB1219)

Industrial equipment distribution was controlled by order L-123, issued May 26. (WPB1220)

Farm equipment and hardware restrictions in order M-21 and M-21-b were relaxed by amendment No. 5. (WPB-T363)

Armor piercing shot steel for 90 mm. shot is placed under complete allocation by amendment 1 to order M-21-f, issued May 26. (WPB-T370)

Corporation financial reports studies conducted by OPA apply only to a selected list of corporations with assets over $250,000 in the manufacturing, mining, construction, and wholesale fields. (OPA-PM3424)

Iron, steel scrap schedule 4, was amended so that pieces 15 in. wide and as much as 5 ft. long, with some exceptions, may be sold as No. 2 heavy melting steel, according to amendment 5, effective May 25. (OPA-PM3427)

Canned foods order M-68-a was amended May 25 to make it clear that grade preference of fruits and vegetables of the 1942 pack for military and Lend-Lease consumption takes precedence over the can-size preference. (WPB1210)

Steel drum production was aided by inclusion of both hot and cold rolled sheets in order M-45, by amendment No. 2, issued May 25. (WPB-T360)

Power and steam equipment designed for marine use exclusively is exempt from control by order L-117, by amendment 1, May 25. (WPB-T361)

• • •

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 *means announcement 600 issued by the War Production Board.)*

Furnace Grates

• • • **OPA's consumer** division has announced that grates for furnaces, boilers and stoves can now be obtained without priority ratings by home owners who are converting their heating plants from oil to coal.

↓ ↓

Cutlery

• • • **The manufacture of** industrial food processing machinery was ordered to continue at the same rate beginning June 1 as during the year ended June 1, 1940, under order L-140. The manufacture of cutlery used in homes, butcher shops, hotels, and other commercial establishments in the preparation of food must not use more than 60 per cent of the weight of metal used quarterly during the year ended June 30, 1941. The manufacture of cutlery used in serving and eating food was cut to 35 per cent of the metal used quarterly in its production during the year ended June 30, 1941, and non-essential cutlery such as carving sets, penknives, pocket knives and other implements must cease after June 30.

↓ ↓

Beryllium

• • • **Complete allocation** of beryllium was ordered by WPB under order M-160. Until July 1, beryllium may be delivered without allocation to produce an article with an A-1-c rating or higher. Consumers must file requests for allocation on Form PD-496 by the 20th of the month preceding the month in which delivery is desired, and must file a monthly report on Form PD-497. The latter form also must be filed by any person who has as much as 10 lb. of beryllium in his possession in any month for a report to WPB.

↓ ↓

Office Machinery

• • • **In a move to** hasten conversion of the office machinery industry to 100 per cent war work WPB sharply curtailed the manufacture of various types of office machinery and set up a distribution system so that only essential users may obtain the machines. Previous orders, L-54-b and amendments governing the distribution of office machinery are revoked. The order L-54-c, is designed to regulate production until the end of the year.

↓ ↓

Container Closures

• • • **WPB limited** the use of blackplate for beer and soft drink closures to 70 per cent of the number of closures made in 1941 by order, M-104 as amended. The completion, sale and delivery of tin or blackplate closures manufactured or in process on the date of the order, which cannot be used for other products is permitted. There are no restrictions placed on the use of scrap, waste, reclaimed or used tinplate, terneplate, etc.

The order lists various uses of blackplate that are no longer permissible and the dates on which use must be stopped. Closures designed for malt and non-alcoholic beverages is limited to 20 per cent of the number of such closures used in 1941.

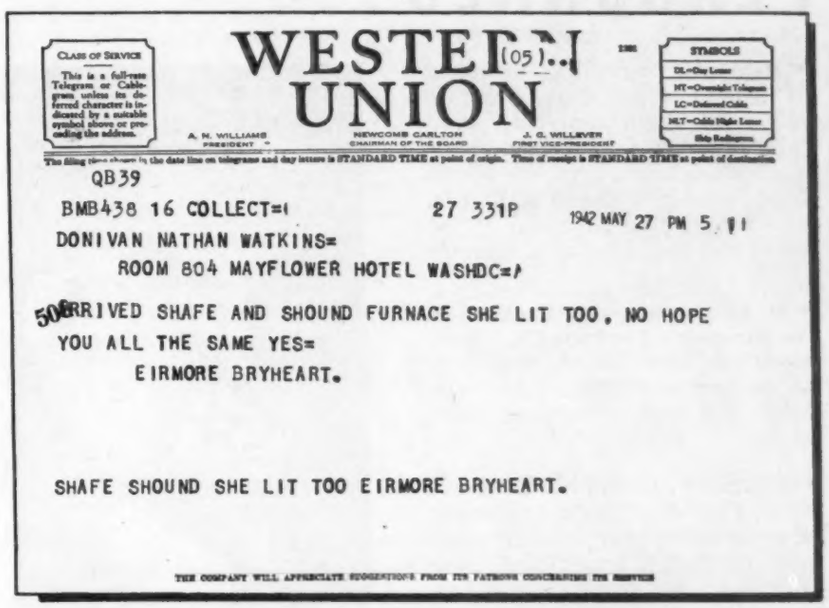
New Southern Furnace of Republic Put in Blast

• • • **After asserting** that "this is the furnace of the people of the United States" and is "symbolic of the determination of the people of this country to remain free," Gov. Frank M. Dixon of Alabama on May 27 applied the torch to the new air-conditioned Southern blast furnace of Republic Steel Corp. First stack to be built under the new expansion program, it was built in the fast time of 88 days.

The furnace was turned over to R. J. Wysor, Corporation president, by E. I. Evans, Southern district manager for Republic. Mr. Wysor said he was proud to receive the furnace "because the furnace was built in record time and represents the best in the art of building blast furnaces which has been as yet devised . . . because this furnace will add material to the successful prosecution of the war in which we are engaged today."

An atmosphere of seriousness and gravity marked the entire program, which started at the furnace at 11.45 a.m. and closed with a luncheon.

Built by the Defense Plant Corp., the new furnace is being operated by Republic as lessee. Alabama now has 21 producing blast furnaces, compared to 18 a year ago.



CLASS OF SERVICE

This is a full-rate Telegram or Cablegram, unless its deferred character is indicated by a suitable symbol above or preceding the address.

WESTERN UNION

A. N. WILLIAMS, PRESIDENT — NEWCOMB CARLTON, CHAIRMAN OF THE BOARD — J. C. WILLEVER, FIRST VICE-PRESIDENT

SYMBOLS
DL=Day Letter
NT=Overnight Telegram
LC=Deferred Cable
NLT=Cable Night Letter
Ship Radiogram

The filing time shown in the date line on telegrams and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

QB39

BMB438 16 COLLECT=(27 331P 1942 MAY 27 PM 5 11

DONIVAN NATHAN WATKINS=

ROOM 804 MAYFLOWER HOTEL WASHDC=

50ARRIVED SHAFE AND SHOUND FURNACE SHE LIT TOO, NO HOPE YOU ALL THE SAME YES=

EIRMORE BRYHEART.

SHAFE SHOUND SHE LIT TOO EIRMORE BRYHEART.

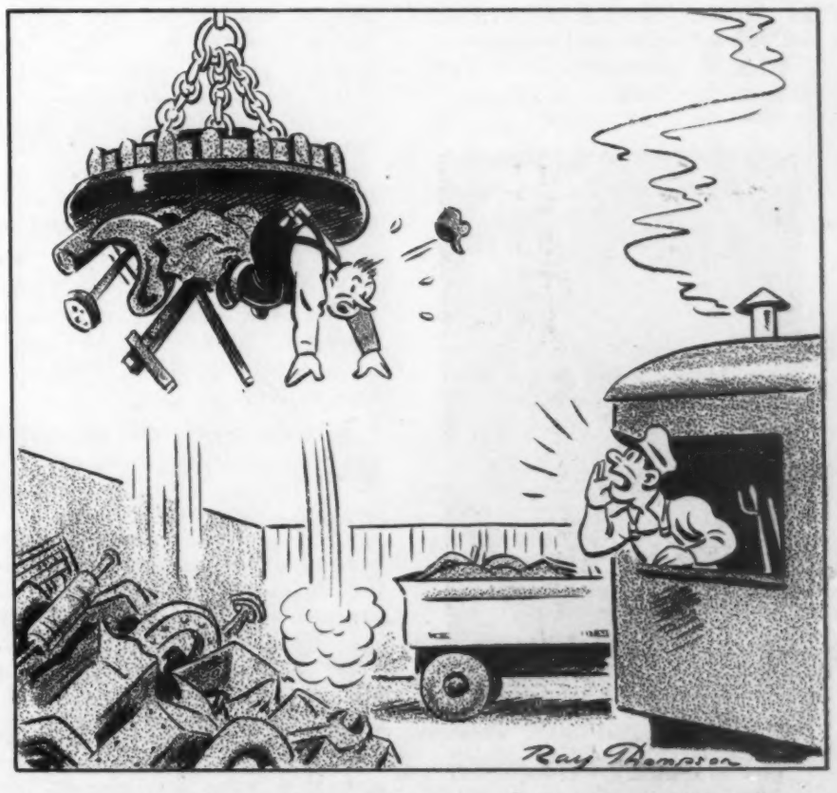
THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

STACK LIT, TOO: Don Watkins, chief of the construction division of the WPB Iron and Steel Branch, received this telegram from a subordinate who attended the firing of the new Republic stack in the South last week.

Chemicals Allocated In 6 New "M" Orders

• • • **Six chemicals were** placed under complete allocation control by the WPB in six M orders issued May 30, effective July 1. The orders cover the following: M-163, by-product and sulphate of ammonia; M-164, synthetic ammonia; M-165, cyanimid; M-167, capryl alcohol; M-168, isopropyl alcohol; and M-169, methyl ethyl ketone. Manufacturers and retailers of fertilizer and their agents are not included. Producers and distributors of the chemical covered by these orders, M-163, M-164, and M-165, are required to file Form PD-237 prior to the 10th of each month, beginning with June.

Orders M-167, M-168, and M-169 provide that no producer may use and no producer or distributor may deliver the chemicals covered, except by express WPB permission. Certain forms are provided which must be filed with WPB as the basis for allocation. Under M-167, forms PD-525 and PD-526 must be used; under M-168, PD-521 and PD-522; and under M-169, forms PD-525 and PD-524 must be filed.



"Serves ya right comin' round th' scrap pile with that big wrench tryin' to sneak a few bolts!"

PERSONALS . . .

• **Henry M. Hogan,** vice-president of General Motors Corp. and a director of North American Aviation, Inc., has been named chairman of the board of North American, succeeding **Ernest R. Breech,** who resigned as chairman of the board but continues as a director

• **H. D. Hubbs,** sales manager of the Monmouth Products Co., Cleveland, has been elected treasurer of the company. Mr. Hubbs will retain his position as sales manager.

• **William P. Gwinn** has been appointed assistant general manager of Pratt & Whitney Aircraft division of United Aircraft Corp., East Hartford. Mr. Gwinn, who has been assistant sales manager of Pratt & Whitney the past two and one-half years, came with the company in January, 1927. In 1929 he was transferred to the sales department and three years later was named West Coast representative for the company. After six years in that post he returned to the main office as assistant sales manager. He has also served as an assistant secretary of United Aircraft Service Corporation, which position he will retain.

WILLIAM C. JOHNSON, whose appointment as manager of the general sales organization of the Allis-Chalmers Mfg. Co., Milwaukee, was announced in these columns last week.

HENRY M. HOGAN, chairman of the board, North American Aviation, Inc.

• **H. J. Mokate** has been appointed assistant to the vice-president of Scully Steel Products Co., Inc., Chicago, and **Andrew Verschuur** has been appointed manager of sales for the Chicago district. Mr. Mokate, who started with United States Steel Corp. in 1920, was manager of sales, secondary products division, of Carnegie-Illinois Steel Co., Pittsburgh, previous to his new assignment. Mr. Verschuur joined Scully as an office boy in 1894 and had served as assistant general manager of sales previous to his new appointment.

• **Allen H. Stewart** has been named New York district sales manager, Midvale Co., Philadelphia, replacing **R. M. Bird** who died on May 8.

• **Bertram Bredy,** who since 1925 has been Chicago representative of Thompson Wire Co., Boston, and for three years general manager of the wire company's Chicago plant, has resigned his position to devote his entire time to his own company, Bertram Bredy Co., Chicago, dealers in steel, brass and copper products and alloys.

• **William A. Minkler,** former assistant sales manager, has been appointed sales manager of the catalog products division of Young Radiator Co., Racine, Wis., and also will do special work in connection with the firm's war production program.

• **George Montague Williams** has been elected chairman of the board of directors of American Central Mfg. Corp., Connersville, Ind. This post is in addition to his election some time ago as vice-chairman of Vultee Aircraft, Inc. Mr. Williams also is chairman and president of Russell Mfg. Co., Middletown, Conn.

• **D. U. Bathrick,** general sales manager of the Pontiac Motor Division of General Motors Corp., has been made director of a gun school established to train instructors for the Navy in operation, and maintenance of anti-aircraft cannon being manufactured by Pontiac. **Walter Martin,** assistant service manager, heads the technical section of the school and **O. M. Dahl** is chief instructor.

• **James A. Herrington** has been elected president of Knu-Vise, Inc., Detroit, replacing Frank McKenna believed to be lost somewhere in the West. Piloting his own airplane, McKenna took off on an extended business trip last October and has not been heard of since he reached Oregon. Mr. Herrington joined the Knu-Vise organization as general manager in 1939, going from the Fruehauf Trailer Co. where he was assistant superintendent of the body plant.

JAMES A. HERRINGTON, president, Knu-Vise, Inc., Detroit.

• **L. P. Jackson,** director of engineering of Mid-West Abrasive Co., Detroit has been named vice-president in charge of engineering. At the same time **Roy A. McElhinney,** superintendent of production was named vice-president in charge of manufacturing.

• **A. W. Kimbell,** for the past 14 years vice-president and general manager, was elevated to the presidency of the United-Carr Fastener Corp., Cambridge, Mass. **Sinclair Weeks,** the retiring president, was elected chairman of the board. The following additional elections were announced: As vice-presidents, **C. Loring Hall,** manager of the Detroit office of the corporation; **Lester W. Tarr,** general manager of the Ucinite Division of United-Carr Fastener Corp.; **George S. Maynard,** general sales director, and **Daniel J. Rogers,** assistant general manager. Assistant vice-presidents named include **Warren C. Anderson,** the corporation's Washington representative; **Walter I. Jones,** and **Raymond O. Chaffee,** chief engineer. **C. Loring Hall** was also elected a director of the corporation to fill the vacancy created by the resignation of Aubrey S. Boynton.

• **Peter N. Jansen,** general factory manager of the Curtiss-Wright Corp., airplane division, has been appointed director of manufacturing. **John Lee** has been appointed assistant director of manufacturing on tooling and manufacturing processes; **J. P. Davey,** assistant director of manufacturing for production planning and production control; **W. A. Schanne,** assistant to the director of manufacturing, in charge of labor measurement, procedures, schedules, estimating and costs; **Frank A Maley,** director of purchasing priorities and traffic, and **E. P. Riexinger,** assistant to the director of manufacturing as division plant engineer for new construction, plant engineering and safety engineering.

• **Frank H. Dewey,** general manager of the Gar Wood Air Conditioning Division, Gar Wood Industries, Inc., Detroit, has been elected a vice-president of the company. He will continue his duties as general manager of the Air Conditioning Division.

• **Clyde Mooney,** chairman of the Detroit Chapter of the American Society of Tool Engineers, has become affiliated as an engineer with the American Engineering and Designing Co., Detroit. Mr. Mooney, who has been engaged in tool engineering for the last 14 years, has been active in ASTE since its formation about 10 years ago. He has served in the engineering departments of several Detroit plants, including Chevrolet Gear & Axle Division of General Motors Corp.

• **Laurence H. Chase** has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio. He has been assigned to the division of organic chemistry.

• **George F. Kroha,** vice-president and general sales manager and **George C. Calvert,** vice-president in charge of the Elyria, Ohio, plant have been elected to the board of directors of the Pfaudler Co. Both men have been identified with the Company many years. Joining the Pfaudler organization in 1920 as assistant advertising manager, Mr. Kroha later held the position of advertising manager and became general sales manager in 1930. **Claude Birch** has been appointed assistant treasurer.

• **Frank G. Luth** has joined Iron & Steel Products, Inc., Chicago, as mechanical superintendent.

• **F. C. Baselt** has been appointed manager of research, Atlantic Division, of the American Can Co., New York. Mr. Baselt has been with the company for 17 years, and has been in the New York office for the past six years.

• **T. L. Ball,** who was superintendent of ore mines with the Gulf States Steel Co., Birmingham, before that company was purchased by Republic Steel Corp., has become associated with Alabama By-Products Corp., Birmingham, as a member of the corporation's operating department.

• **Gerald F. Coons** has been appointed manager of sales of the National Tube Co.'s New Orleans sales office. Mr. Coons succeeds **Harry L. Bialock,** who has recently become associated with Tubular Products, Inc., the new U. S. Steel subsidiary in Gary, Ind.

• **E. R. Lombard,** assistant personnel supervisor of the General Electric Co., Taunton, Mass., plastic division, has been made personnel director. He has been associated with General Electric since 1940.

OBITUARY . . .

• **Edward Hanson,** assistant mechanical superintendent of the Pullman Co., Chicago, and associated with the firm for more than 50 years, died of a heart attack in Milwaukee. He was an expert on car construction and at the time of his death was superintending the erection of hospital trains, the same type of work in which he was engaged during the first World War.

• **Willard L. Hartley,** sales engineer for the Bucyrus-Erie Co., Milwaukee, for the past five years, died of a heart attack on May 18.

• **George Flynn,** former erecting engineer for the George Meyer Co., Milwaukee, died after a long illness, aged 57 years. He formerly was associated with the Michael Tundt Co., Waukesha, Wis.

• **Eugene Worthing,** president of the Bayley Blower Co., Milwaukee, died May 23 after a short illness. He was 76 years old. He had been president of the company for 27 years, having gone to Milwaukee to assume that position with the Bayley Mfg. Co., its predecessor, from Chicago where he was in charge of the branch of Sturtevant.

• **George Challoner,** president of the Wilkin-Challoner Mfg. Co., Oshkosh, Wis., died suddenly on May 24. He was 57 years old.

• **Charles A. Dunn,** 78 years old, founder of the Butt Welding Co., Detroit, died recently.

• **A. E. Crockett,** special sales representative for the Jones & Laughlin Steel Corp., Pittsburgh, died May 20 after a short illness. He was 69 years old. Mr. Crockett had been associated with Jones & Laughlin since May, 1915, when he joined the organization as an engineer. In 1919 he was appointed manager of the bureau of instruction and later was made special sales representative.

• **G. W. Stetson,** owner of Stets Co., Boston, and inventor of steam regulators and other power equipment, died at Hingham, Mass. He was born in Woburn, Mass., 65 years ago.

• **M. S. Greenberg,** partner in the firm of M. Greenberg Sons, San Francisco brass foundry, died May 26. He was 51 years old.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Further Tool Plant Expansions To Be Halted by WPB

Cleveland

• • • **It is reported that** no further machine tool expansions will be approved by Washington other than those now under way. Moreover, it is likely that federal officials will closely examine arrangements which may have already been made for new plants or new facilities with an eye toward possible substitution of subcontracting in order to conserve the new facilities and equipment that would be required in such expansion. In the latter connection, district offices of the WPB are already making surveys of idle machine tool hours, and it is likely that this will presage some government commandeering of machine tools not in constant use. Observers say that WPB will maintain its records of the relative use of various machine tools in the different district offices, rather than combining such information to be available in their Washington headquarters.

In the midst of government efforts to increase subcontracting, there now looms what may develop to be a substantial handicap in the form of transportation priorities. Many small plants are operating in rather isolated areas, performing highly specialized functions, so that the assignment of subcontracts to such plants would involve the transportation of materials to and from these points, and it is highly doubtful that the means of conveyance, either railroad or trucking, will be easily made available.

The Jack & Heintz Co. is reported to have purchased close to $2,000,000 worth of machine tools and auxiliary equipment for installation in its latest plant expansion. Meanwhile, Ohio Crankshaft Co. has arranged to construct a new plant to further expand its greatly enlarged facilities. In addition, the Allyne-Ryan Foundry Co. is making various alterations to its plant.

Expect Change in Quotas

Chicago

• • • **Although it is still too early** to appraise the full effectiveness of the new machine tool allocation plan, it is already evident that some modification of the original order will be necessary, particularly with reference to the percentage quotas allotted to the various user classification, observers here report.

Generally speaking, the machine tool trade here feels that the theory behind the new setup represents a distinct improvement over the preceding plan and, with minor changes, will probably be as good a method of distribution as can be developed under present conditions.

While the influex of new orders is currently running sharply below the tremendous volume of April, new business is still close to 50 per cent above the rate of production in several of the more popular lines.

Little "Pirating" of Workers

Cincinnati

• • • **Washington's suggestion that** orders "freezing" labor are imminent in critical industries, had little reaction in this area during the past week. In fact, those directing the U. S. Employment office as well as several leaders in the machine tool industry indicated that little if any "pirating" of employees has been experienced here. Of course, there is some shifting of workers, especially away from night shifts to day where they can find an opening. Otherwise, the industry reports little difficulty in retaining present workers. On the other hand, openings for more skilled men are still available primarily on third shifts, although in many instances second shifts are still not wholly manned.

Sold under well-known trademarks, Continental-Superior steel sheets are made with more than 30 different kinds of surface treatments, finishes and coatings to suit the individual needs of manufacturers and sheet metal workers.

The Superior Sheet Steel Co., Canton, Ohio
(Division of Continental Steel Corp.)

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Tin Salvage Efforts Now More Effective

• • • **After an indifferent start,** the recovery of tin from used cans is more gratifying. For instance, at New York the doggedly continued household campaign has yielded 60,000 lb. of tin since March 11 and 3000 tons of scrap steel.

Properly directed efforts can readily recover some 5000 tons of tin and about 500,000 tons of fairly well detinned steel scrap.

Last year, production of plate for use in cans was 2,730,000 tons, of which 2,330,000 was hot dipped. The balance was electrolytic, terne and black plate. Twenty pounds of tin can be recovered from a gross ton of hot dipped cans. But as more electrolytic lines come into production later this year, and as more hot dipped plate is exported on lend-lease (See THE IRON AGE, April 30) the potential tin recovery will probably fall off to half this figure. If it is proposed to recover any substantial amount of tin then it would well be done quickly.

Germany, Japan and Italy, although minor users of tin, have of necessity been recovering a considerable portion of their tin for years, not only for canning but for bearings and other industrial applications. The need for more can detinning facilities is urgent in this country now and may so continue for a long time.

Plans for tin can collections in 36 metropolitan areas were announced this week by the WPB. In 32 of these centers, householders will be asked to prepare cans by cleaning, removing top, bottom and label, and flattening the sides so as to leave ½-in. space for the detinning fluid. The plants in these areas have an estimated annual detinning capacity of 250,000 tons of cans.

In four other districts unprepared cans will be collected for shredding and delivery to copper mines where they will be used in the process of reclaiming copper through precipitation.

There are about eight detinning plants in operation throughout the nation, but the exact number of new plants required to handle this job can not be determined until more data on collections is available. Plans do, however, contemplate the erection of shredding units in communities which cannot possibly collect the 40,000 gross tons annually required to maintain a detinning plant. Properly prepared cans weigh about 16 lb., shredded cans about 12 lb., per cu. ft. The usual minimum car weight is 15 gross tons. Where barges can be used, shipping costs will naturally be lower, but properly prepared cans can be shipped economically by rail for distances up to 500 miles.

Three new government-owned aluminum plants started operations in May, a fourth is expected to go into production early this month, and the entire first expansion program of seven plants will be in production by Aug. 1 All plants will be completed ahead of schedule. They were built for the government by the Aluminum Co. of America, which will operate them. Plants in the second expansion program will start coming in about December of this year, and the full capacity of the industry is expected to be attained early in 1943.

OPA has delayed until July 1 the cut in fabricated aluminum prices originally scheduled to take effect on June 15.

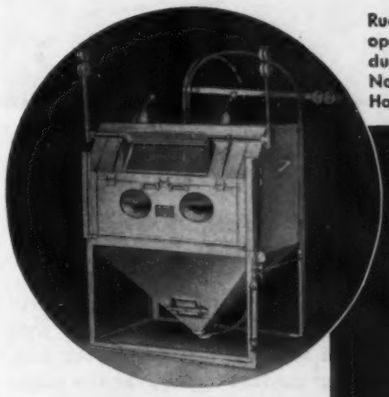
WPB on Monday set the June lead pool at 15 per cent of April production. The amount is unchanged from recent months.

George C. Heikes has been appointed chief of WPB's zinc branch, replacing David Uebelacker, who has rejoined Ford, Bacon & Davis. Mr. Heikes, a mining engineer and a geologist, was formerly with National Lead Co., and became assistant chief of the copper, zinc branch in 1940.

SAND BLASTING *Made Easy*

for Defense Production!

Ruemelin Sand Blast Cabinets put blast cleaning operations on a faster, more efficient basis. Eliminate dust, permitting installation anywhere in the plant. No skilled labor required. Sturdily constructed. Handles sand or steel abrasives. Prompt delivery.



RECOMMENDED FOR:

1. Heat treating plant — removing scale, oxides.
2. Aircraft production—cleaning welds, metal preparation.
3. Foundries, ferrous and nonferrous — cleaning castings.

Ruemelin cabinet with door open. Provides quick access for loading and unloading.

RUEMELIN MANUFACTURING CO.
3960 N. Palmer St • Milwaukee, Wis.

RUEMELIN Blast Cleaning Cabinets

SCRAP

. . . MARKET ACTIVITIES AND QUOTATION TRENDS

Reports of Districts Indicate Better Flow

• • • **Reports from many** scrap consuming centers this week indicate the supply situation has undergone improvement. Scrap is declared to be coming out faster at Buffalo, Cincinnati, Birmingham, Toronto, St. Louis and Pittsburgh. Some yards are working 24 hr. per day at Buffalo.

More iron and steel scrap is beginning to be generated from the manufacture of war goods than previously was believed possible, according to E. C. Barringer, president and secretary of Institute of Scrap Iron & Steel, Inc. There are indications, he says, that the scrap yield from war output will exceed normal peacetime ratios per ton of steel cut up.

Barringer, who by his position and contacts at Washington is afforded an unexcelled view of the scrap picture, reports dealer and consumer inventories of scrap slightly improved over the nation. A few foundries have succeeded in building stocks and are refusing to buy or trying to buy at low prices, he asserts.

The improved position of dealers and consumers is credited by Barringer to seasonal conditions, public collection campaigns, better returns from auto wrecking yards, plus increased quantities from the output of war products. There are indications that other scrap sources, like the railroads, may yield more old material than they have during the past six or eight months.

All in all, the Institute president feels certain that there will be no shortage of scrap in 1942, although tight situations may occur in the late months of this year. No predictions for 1943 can be made, he says.

The effective date of the ODT edict requiring truckers to carry loads in both directions (see Chicago scrap market of May 21) has been postponed from June 1 to July 1. Some modification is imperative, if vital truck collections are to continue.

Scrap Placed Under Import Control With Other Items

• • • **Scrap iron and steel,** as well as aluminum scrap, copper scrap, reclaimed lead, magnesium, and various other scrap items and alloys, were placed under import control Monday by WPB with the addition of these items to Order M-63. This was accomplished by Amendment No. 7 to Order M-63.

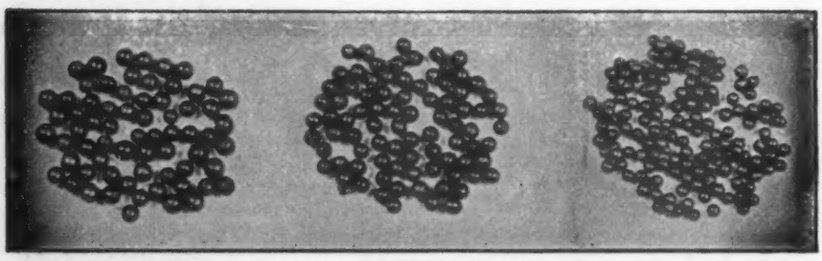
Order M-63 is the general imports order, which restricts private importation of strategic and critical materials and sets up methods for purchase of these materials by government agencies. It does not prohibit importation under contracts existing at the time of publication of the order.

Auto Graveyards Yielded 350,000 Tons of Scrap in April

Washington

• • • **Auto graveyards** yielded approximately 350,000 tons of scrap from more than 400,000 cars during April. Included in the volume was about 6000 tons of copper. This, according to WPB's Automobile Graveyard Section, is about 200,000 tons more than the monthly average of scrap recovered from junked cars in 1941. Officials of the bureau expressed confidence that the auto scrap campaign will help considerably in meeting what they say is a 1942 scrap shortage estimated at 6,000,000 tons. The first year of the campaign is expected to see some 500,000 old cars scrapped each month.

"Reports from the field," said Merrill Stubbs, chief of the automobile graveyard section, "indicate that the months following April should show an even greater increase in the amount of scrap



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

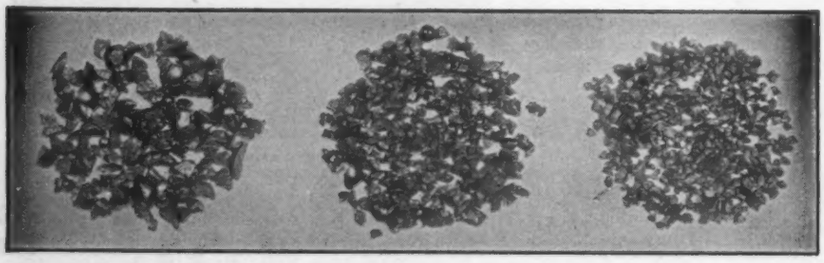
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



metal recovered from automobile graveyards. There are at present in this country 6,837,781 cars more than 10 years old.

•

PITTSBURGH — Scrap drives plus warmer weather apparently have contributed to a much better flow of scrap here since no tight situations have appeared during the past week. The view is growing in some quarters that scrap collections may hold up until additional blast furnaces are brought in, thus possibly forestalling important shortages next winter. There are still some who maintain that given an additional amount of scrap, the steel industry could operate at above rated capacity for an extended length of time.

•

CLEVELAND — Although the movement continues improved in the Cleveland and Youngstown districts, very few steel mills have been able to pile up a reserve winter supply thus far, although a number of foundries are reported to be making progress in this direction. One mill in the Valley is reported to have been accumulating inferior grades. Some dealers had been asked to file an affidavit of compliance with OPA regulations in order to secure licenses.

•

PHILADELPHIA—Four waste collectors of the Department of Public Works were discharged for alleged passive sabotage of the tin can salvage drive. Nevertheless, city officials say the collection is leading the nation. The city's farmers exceeded their goal with a 66-ton farm scrap collection in one day. Rejections of cars by steel mills continue abnormally high.

•

ST. LOUIS—Receipts of scrap have shown a substantial increase within the last few weeks, and some mills are piling up inventories while operating at peak capacity. Besides the speeding up of nearby automobile and agricultural scrap, much Southwestern scrap is reaching this market instead of Pittsburgh and other eastern points.

•

CHICAGO—Good weather and intensified auto graveyard scrap operation resulted in an improvement in the flow of scrap here to the point where there is no fear of an immediate curtailment in operations due to lack of scrap. However, very little if any headway is being made to build up stocks against the winter.

•

BUFFALO—Scrap is now coming out faster than most dealers here are prepared to handle it. Several of the larger yards are working on a 24-hour-a-day basis. Even the auto graveyards are loosening up. Practically all foundries have started a reserve stockpile for next winter and prospects are there will be plenty stored away when winter comes if the present flow is maintained. Conservative estimates place the flow of scrap at 40 to 50 per cent ahead of the amount available the same time last year.

•

TORONTO — With fresh offerings of scrap pouring into the markets from all parts of the country, supplies are now in excess of actual consumer requirements and many melters are engaged in replenishing yard stocks. This flood of scrap, however, is rapidly depleting the resources of the Dominion and by the time winter comes it is believed that practically all surplus stocks will have be n gathered in, leaving little or nothing for the future. Local dealers have been taking about 500 tons of tin cans from the city each month, paying $5 ner ton delivered dealers yards. A new contract is under negotiation which will bring the price the city receives for this type of scrap to $7.07 per ton.

•

BOSTON — Business is fairly good. Some items, such as breakable cast and shafting, are hard to obtain, and only small amounts of stove plate are available. No. 1 heavy melting steel is occasionally obtainable in round tonnages, while No. 2, consisting largely of automobile scrap, is fairly free. Supplies of turnings, blast furnace material, skeleton and chemical borings are better than normal. Considering New England was drained of scrap, the current showing is quite satisfactory.

•

MILWAUKEE—Some 250 tons of idle and obsolete machinery at the old Eline plant which manufactured chocolate in various forms, was purchased by Grede Foundries, Inc., Milwaukee, and shipped to its Waukesha plant.

BIRMINGHAM—In a relatively favorable position from the standpoint of present scrap needs, steel mills in this area are endeavoring to lay in a surplus as insurance against possible declines later. Some shell turnings have become available in this district for both open hearth and electric furnace use.

•

CINCINNATI—Modification of M-24 by Washington has had a stimulating affect upon the local market and consumers are actively attempting to build inventories against next fall and winter. As a result, scrap continues to move in good volume despite the restrictions although some hesitancy is still shown over the proper interpretation of government specifications.

•

WASHINGTON—The Bureau of Industrial Conservation congratulated the E. I. du Pont de Nemours plant at Grasselli, N. J., on an outstanding salvage campaign. The du Pont company in one month collected 100.5 tons of scrap, 9.5 of hard lead, 5.25 tons of copper, 3 tons of brass, 1.75 tons of aluminum, 1.75 tons of stainless steel, ¼ ton of monel metal. In addition, 1073 tons of scrap rubber were collected.

•

OLD GREENWICH, CONN. — Greenwich, Conn., will soon ask bids on removal of 115 tons of abandoned street railway rails.

LEWIN-MATHES *Got the right answer at*

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from ⅜" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

(All the prices given below are per gross tons and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES											
				Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
				Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punchings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minneapolis, Colo.	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

BUNDLES consisting exclusively of tin coated material and compressed into charging box size, are $4 per gross ton below No. 2 dealers' bundles. Bundles containing tin coated material but not composed exclusively of such material (outlawed by order M-24-b) are $8 below No. 2 dealers' bundles.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports $1; New England $1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than $1, but not more than $5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than $5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where more than one grade of scrap is included in a shipment, the maximum price of all scrap in the vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use), add $5 to price of cast iron borings.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington,	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 machinery cast, drop broken, 150 lbs.			
No. 1 cupola cast	$18.00	$19.00	$20.00
and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*. Prices Are F.O.B. Maior Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	June 2, 1942	May 26, 1942	May 5, 1942	June 3, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain Wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

*Mine producers only.

Pig Iron: (Per Gross Ton)	June 2, 1942	May 26, 1942	May 5, 1942	June 3, 1941
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	June 2, 1942	May 26, 1942	May 5, 1942	June 3, 1941
Heavy melting steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Los phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$5.00	$6.00	$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.25
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 150 to 158 herein.

. . . Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
June 2, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1942	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71 May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[13]			3.39¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢[14]			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[14]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massilon, Canton =2.70¢						2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.27¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright[15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

DISSTON

has the Experience... Equipment... Personnel to make FINER TOOL STEELS

• Disston pioneered in the manufacture of fine tool steels with the first crucible saw steel ever made in America—in 1855. Today those 87 years of experience are expressed in superior steels that are meeting the demands of many industries for the utmost in quality and performance.

Disston tool steels are produced by precise modern methods:—Melted from selected materials in Heroult arc furnaces . . . skillfully forged and rolled . . . carefully annealed in automatically regulated equipment.

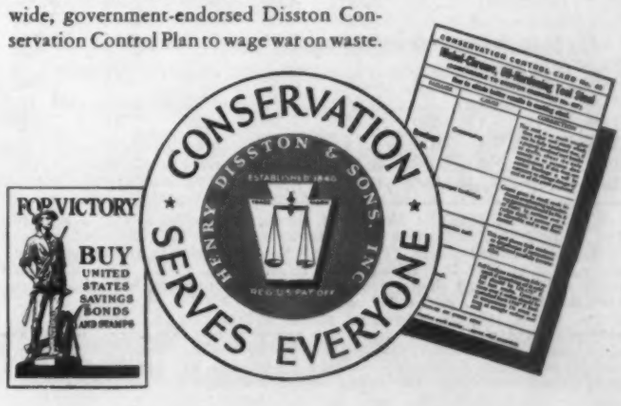
Expert personnel, trained in the Disston tradition, is assurance that all Disston equipment is ably and intelligently manned—to uphold a steadfast principle of uncompromising quality.

With such experience, equipment and man power Disston has been able to produce superior tool steels like Nicroman—an extremely tough steel, highly resistant to shock and subject to very slight deformation in heat treatment.

When you want advice: Disston engineers and metallurgists are at your service, without obligation, to help you select the right tool steels for better work and longer tool life . . . If you have not received your *free* copy of the illustrated 73-page book, "Disston Tool Steels", write today to Henry Disston & Sons, Inc., 619 Tacony, Philadelphia, Pa., U. S. A.

Free DISSTON CONSERVATION CONTROL CARDS

Write today for Disston Instruction Cards on six types of Tool Steels. They contain valuable information to help you get better results, reduce breakage, save time and conserve essential materials. These are a feature of the nation-wide, government-endorsed Disston Conservation Control Plan to wage war on waste.



SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c
Worcester, Mass.	2.10c
Birmingham	2.00c
San Francisco	2.50c
Galveston	2.25c

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton Massillon, Buffalo, or Bethlehem, per gross ton $54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c
Straight molybdenum	54c
Tungsten-molybdenum	57½c
High-carbon-chromium	43c
Oil hardening	24c
Special carbon	22c
Extra carbon	18c
Regular carbon	14c

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	$25.53	$25.03	$26.53	$26.03	.....	.....
Brooklyn	27.65	.....	.....	28.15	.....	.....
Jersey City	26.62	26.12	27.62	27.12	.....	.....
Philadelphia	25.89	25.39	26.89	26.39	.....	.....
Bethlehem, Pa.	**$25.00**	**$24.50**	**$26.00**	**$25.50**	.....	.....
Everett, Mass.††	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Swedeland, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Steelton, Pa.	.....	**24.50**	.....	.....	**$29.50**	.....
Birdsboro, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	**29.50**	.....
Sparrows Point, Md.	**25.00**	**24.50**	.....	.....	.....	.....
Erie, Pa.	**24.00**	**23.50**	**25.00**	**24.50**	.....	.....
Neville Island, Pa.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Sharpsville, Pa.*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Buffalo	**24.00**	**23.00**	**25.00**	**24.50**	**29.50**	.....
Cincinnati	24.68	24.68	.....	25.18	.....	.....
Canton, Ohio	25.47	24.97	25.97	25.47	.....	.....
Mansfield, Ohio	26.06	25.56	26.56	26.06	.....	.....
St. Louis	24.50	24.00	.....	.....	.....	.....
Chicago	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....$31.34
Granite City, Ill.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Cleveland	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Hamilton, Ohio	**24.00**	**23.50**	.....	**24.00**	.....	.....
Toledo	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Youngstown*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Detroit	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	**$28.00**
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	**33.00**
St. Paul	26.76	.....	27.26	26.76	.....	.....
Duluth	**24.50**	.....	**25.00**	**24.50**	.....	.....
Birmingham	**20.38**	**19.00**	**25.00**	.....	.....	.....
Los Angeles	27.25	.....	.....	.....	.....	.....
San Francisco	27.25	.....	.....	.....	.....	.....
Seattle	27.25	.....	.....	.....	.....	.....
Provo, Utah	**22.00**	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace **$23.50**

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

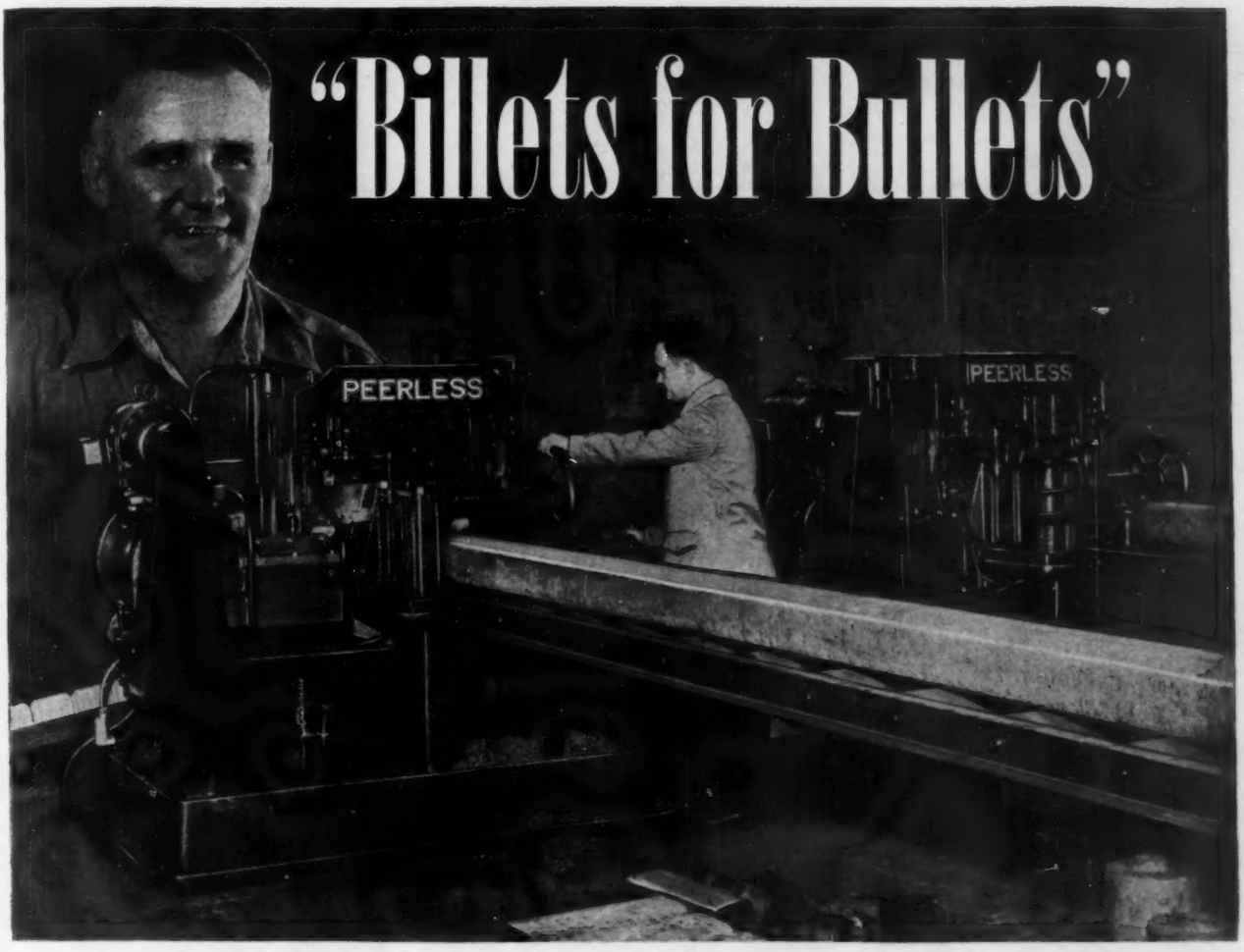
Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, *Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)*

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los† Angeles
Sheets, hot rolled (10 ga.)	$3.35	$3.25	$3.35	$3.55	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.50	$3.38	$4.95
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	4.68	....	4.24	4.35	4.23	7.15
Sheets, galv. (24 ga.)	4.65	4.85	4.62	5.05	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.95
Strip, hot rolled	3.60	3.60	3.50	3.51	3.96	3.68*	3.82	4.06	3.70	3.74	3.85	3.73	4.90
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates (¼ in. & heavier)	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.90
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.60
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.35
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.48	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, $3.43. † Los Angeles prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.



. . . Or Steel For Any Other Need Is Cut Fast and Straight With Peerless Saws

Performance Report "D"*

Billets for 155 mm shells are Sawed on Peerless 14" High Duty Hydraulic machines at a rate of 5 sq. in. a minute. The cool-cutting blade does not fracture or surface harden the metal — as high as 2000 sq. in. are cut with a single blade. The stock is X1335, 5½" x 5½".

*Name on request.

Billets for bullets or the metal for a variety of other needs can be produced faster — straighter — when you SAW with a Peerless. You get the speed and peak production you need with maximum safety for the man, the material, and the metal.

SAWING avoids all danger of surface hardening or fracturing the metal — you cut the billets to size without smoke, dust, noise or fuss. You remove less metal which means LESS CUTTING TIME . . . LESS HAUL-BACK TONNAGE for the railroads . . . LESS RE-ROLL TIME for the steel mill converting the salvage.

Peerless is the only Saw that gives you the Four-Sided Saw-Frame with Backing-Plate Blade-Support. Use the coupon for details and ask for a complete recommendation from us on any of your metal cutting problems.

PEERLESS MACHINE COMPANY, Racine, Wisconsin

Peerless
METAL SAWING MACHINES

PEERLESS MACHINE COMPANY, Dept. IA-642, Racine, Wisconsin

Mail cutting time estimate for.....

.....

- ☐ Mail catalog on Hydraulic type Saw for High Production Cutting
- ☐ Mail catalog covering Vertical type used for Die Block Work
- ☐ Mail catalog on Mechanical type Saw for production cutting
- ☐ Mail catalog on general utility and maintenance Saws

Company.....

Individual.....

Street.....

City.....State.....

FAST, ACCURATE CUTTING DEMANDS POSITIVE BLADE CONTROL

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk 80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 BW.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	32½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

CAST IRON WATER PIPE

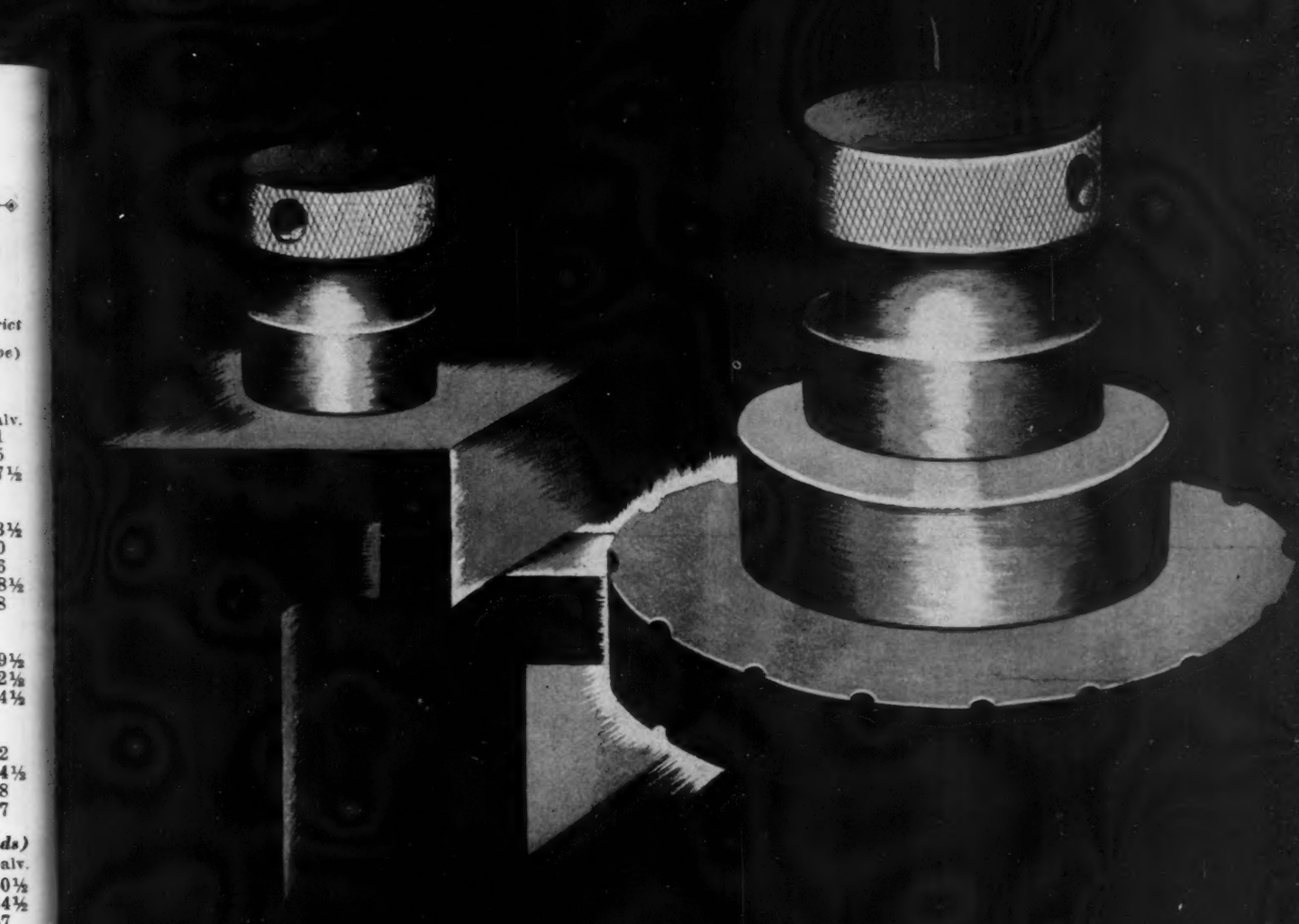
Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

FUEL OIL

No. 3 f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	4.285c.
No. 6 Bur. Stsd., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus., del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c.



Milling cutters fabricated by flash butt welding

Information supplied by "The Iron Age"

Flash butt welding of high speed steel tips on circular blanks for side and face milling cutters is being successfully accomplished, in England.

The blank is notched to form the bottom of the gullet between the teeth and to assure equal spacing of the tips. The welding is done on a hand operated 20-kva. flash butt welder, approximately 15-kva. being actually used. Total welding time runs about 20 minutes. The flash, which is always present with this procedure, is removed during subsequent machining operations.

The complete sequence of operations is as follows:

1. Prepare high speed steel tips to the required shape.
2. Prepare mild steel circular blank.
3. Flash weld tips to shanks.
4. Normalize.
5. Turn and mill to shape.
6. Harden.
7. Grind to finished dimensions.

Metallographic examination of such welds has showed good keying between the tips and blank, with some thermal cracks due to the difference in coefficients of expansion of the two materials. Notwithstanding these cracks, the cutters have been used successfully for months in machining magnesium alloy castings.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company
500 Fifth Avenue • New York City

MOLY

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....$135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50
50% (ton lots, packed)..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio.....$29.50*
Buffalo 30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb, Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo., f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)
(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.....$4.75
Old range, non-bessemer, 51.50. 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*
(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, 46-48 Mn.....66.5c. to 68c.
Indian, 48-50 Mn.....68c. to 70c.
Brazilian, 46-48 Mn.....67c. to 68c.
Cuban, 51 Mn.....81c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)..$28.00
Rhodesian, 45 .....Nom.
Rhodesian, 48 .....Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

†Connellsville, prompt $6.00

Foundry

†Connellsville, prompt..$6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis.....$12.02
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)....39.00

Base per lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts ..... 4.75c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount....63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

FLUORSPAR

Fire Clay Brick *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....$25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..... 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis....$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)..$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

June 4, 1942

SECTION 2

THE IRON AGE
PRIORITIES SECTION

. . . Prepared by the Priorities Staff of THE IRON AGE for use of industry and Government offices dealing with wartime controls of materials and machinery

WARNING

To do business under wartime conditions, industry in the United States and Canada must keep itself informed as to the LATEST developments in Priority Controls.

Please destroy earlier editions of THE IRON AGE Guide. Use only this SIXTH Edition.

Contents

	Pages
How to Use This Guide	12
Index to Material and Equipment Orders	2
Directory of WPB	3-5
Material Conservation "M" Orders	6-12
General Preference Rating "P" Orders	13-18
Production Limitation "L" Orders	19-23
Priority Order "PD" Forms	24-31
PD Forms That Do Not Have to Be Filed	26
Relief from "M" and "L" Orders	32
Machine Tool Preference Rating "E" Orders	32
Priorities Regulations	33
Miscellaneous Orders	33
Production Requirements Plan	33-35
Allocation Classification Symbols	35
Price Schedules	36

• • •

REVISIONS: Each week revisions for keeping this Priorities and Allocation Guide up to date appear in THE IRON AGE. They are printed on the Priorities and Price Page. See THE IRON AGE for details and interpretations of War Production Board orders affecting the metal industries.

THE IRON AGE, 100 E. 42nd St., New York, N. Y.

Copyright, 1942

▼ SIXTH EDITION ▲

Index to Material and Equipment

Numbers following each index subject indicates orders affecting that product. P orders are listed on p. 13, M orders on p. 6, L orders on p. 19, Prices on p. 36, and other orders on pp. 32 and 33

— A —

Acetic Acid—PS-31
Acetone—PS-36
Acrylontrile, Rubber—M-153
Agar—M-96
Agave Fiber—M-84
Air Conditioning—L-38
Aircraft—L-48
  Accessories—P-52
  Civil, Repairs—P-6-a
  Engines—P-4
  Frames—P-3, P-13
  Parts—P-9-a to P-9-g, P-109
  Propellers—P-4
  Trainer—P-109-a, P-122
Alcohol—M-30, M-31, PS-28, PS-37
Aluminum—M-1, M-1-a, M-1-b, M-1-e, M-1-f, PS-2, L-48
  Pigments—M-1-g
  Plant Repairs—P-120
  Scrap—M-1-c, M-1-d
American Can Co.—P-42-a
Amusement Machines—L-21, L-21-a
Anodizing—L-110
Anti-Freeze—L-51
Antimony—M-112
Asbestos—M-79, M-123
Automobiles—L-2 to L-2-i, L-4, L-4-a, L-4-c, P-54, P-57, PS-85

— B —

Batteries, Storage—L-4-b
Beds and Mattresses—L-49
Benzene—M-137
Benzol—M-137
Beverages, Distilled—M-69
Bicycles—L-52, L-52-a
Blind Made Products—P-82
Bob-Pins—L-104
Boilers, Steam—L-102
Bookbinding Wire—P-101
Borax—M-7
Boric Acid—M-7
Burial Vaults—L-64
Burlap—M-47

— C —

Cadmium—M-65, M-65-a, PS-71
Calcium Silicate—M-20, M-20-a
Carbon Tetrachloride—PS-79
Cashew Nut Oil—M-65
Cellophane—L-20
Chemicals, Reagent—P-62
Chlorine—L-11, M-19
Chlorinated Solvents—M-41
Chromium—L-84, M-18 to M-18-b
Closures—L-68
Coal—M-97, PS-120
Cobalt—M-39, M-39-a, M-39-b
Coke—M-97, PS-29, PS-77
Compressors, Heavy—L-100
Construction—L-41, P-130
  Amusement—L-41-a
  Defense Housing—P-19-a, P-19-b, P-19-c, P-19-d, P-19-g, P-19-h, P-55, P-71, P-110
  Highway—L-41-600, P-19-e
  Outside U. S.—P-19
  Plant—P-19-i
Cooking Appliances, Domestic—L-23 to L-23-c, PS-64
Copper—L-106, M-9, PS-15
  Allocations—M-9-a
  Conservation—M-9-c, M-9-c-2
  Mill Repairs—P-106
  Scrap—M-9-d, PS-20
Cork—M-8, M-8-a, M-104
Corundum—M-89
Cranes—P-1, P-5, P-5-a, P-5-b

— D —

Defense Supplies—P-6
Diphenylamine—M-75
Drums, Steel—M-45, P-76, PS-43
Drycleaning Equipment—L-91
Dumbwaiters—P-91

— E —

Electrical Appliances—L-65
  Supplies—M-67
Electroplating—L-110
Elevators—P-91
Escalators—P-91
Explosives, Industrial—P-86
Exports, South American—M-148

— F —

Farm Equipment—L-26 to L-26-b
  Machinery—PS-133
Fire Fighting—L-39, L-43, P-45, P-45-a, P-108
Firearms—L-55, L-60
Fish Hooks—L-92
Fishing Tackle—L-92
Flashlights—L-71
Fluorspar—PS-126
Food Machinery Corp.—P-51
Formaldehyde—PS-21
Freight Cars—L-97-a, L-97-a-1, P-8
Fuel Oil—L-56, M-144
  Tanks—PS-96
Fuels, Solid—PS-121, PS-122
Furnaces, Heat Treating—P-74
  Warm Air—L-22
Furniture, Metal—L-62

— G —

Gas Masks—L-57
Gas, Natural—L-31
Gasoline, Deliveries—L-70
Gears, Pinions, etc.—PS-105
Generating Equipment, Electric—L-102
Glycerine—M-58, PS-38
Graphite—M-61

— H —

Hair Pins—L-104
Hand Truck, Tires—L-111
Hardware, Builders'—PS-40
Health Supplies—P-29
Heating Pads, Electric—L-84
Heating Supplies—L-42, M-67
Helmets, Protective—L-105
Hempseed—M-82
Hoisting Equipment—P-5-a, P-5-b
Household Articles, Metal—L-30, L-62
Housing, Construction—P-71, P-110
  Defense—P-19-a, P-19-b, P-19-c, P-19-d, P-19-g, P-19-h, P-55

— I —

Imports, Strategic Materials—M-63
Incendiary Bombs—L-115
Ink, Printing—M-53
Inventories—L-63
Iridium—M-49
Iron Ore—PS-113
Ironing Machines—PS-86

— J —

Jewel Bearings—M-50
Jute—M-70

— K —

Kapok—M-85
Kyanite—M-143

— L —

Laboratory Equipment—P-62
Lamps, Incandescent—L-28
Lathe, Metal—L-59
Lauric Acid Oils—M-60
Laundry Equipment, Commercial—L-6 to L-6-c, L-91
Lawn Mowers—L-67
Lead—M-38 to M-38-h, PS-69
  Foil—L-25
  Scrap—M-72, PS-70
License Plates—L-32
Lighting, Fluorescent—L-78
Liquified Gas Equipment—L-86
Locomotives—L-97, L-97-a, P-20
  Repair—P-21

— M —

Machine Tools—E-1, E-1-a, E-1-a Rev., E-1-b, E-3, E-4, P-2 to P-2-s
  Export—Directive No. 4; Special Allocation No. 1
  Finishes—L-108
  New—PS-67
  Rebuilt—E-4, P-77, PS-1
Machinery, Canning—P-17, P-42
  Commercial—L-83
  Construction—L-82, L-82-a, PS-134
  Conveying—P-79
  Farm—L-26 to L-26-b, L-53, L-53-a, P-95, PS-133
  Industrial—L-83
  Metal Working—P-11, P-11-a
  Mining—P-23, P-57
  Power Generating—L-94
  Rebuilt—L-83
  Textile—P-53
  Welding—P-39
Machines and Parts—PS-136
Magnesite—PS-75
Magnesium—M-2, M-2-a
  Plant Repairs—P-120
  Scrap—M-2-b
Manila, Fiber, Cordage—M-36
Mercury—PS-93
Mines, South American—P-58
Molybdenum—M-110
Motors, Outboard—L-80
Musical Instruments—L-37

— N —

Naphthalene—M-105
Naphthenic Acid—M-142
Neoprene—M-4
Nickel—M-6, M-6-a, M-6-b, M-6-c
  Scrap—PS-8
Non-Ferrous Products—PS-125

— O —

Office Equipment—L-13, L-13-a, L-73
Oil Burners, Domestic—L-74
Oxalic Acid—PS-78

— P —

Paints, Marine—P-65
Palm Oil—M-59
Pan-American Airways—P-41
Paper, Waste—L-15
Pencils—L-113
Petroleum Industry—M-68, M-68-c, P-83, P-98-a
  British—P-103
  Standard Oil—P-103-a
  Motor Fuel—L-8
Phenols—M-27
Phonographs—L-44, L-44-a
Phosphates—M-16 M-149
Phosphorous Oxychloride—M-35
Pig Iron—M-17, PS-10
Pipe, Soil—PS-100
Plumbing and Heating Equipment—L-79
  Repairs—P-84
  Supplies—L-42, M-67
Polyvinyl Chloride—M-10
Potassium—M-32, M-33
Power, Electric—L-46
  Equipment—L-94, L-102, L-117
Printing Ink—P-94
Production Requirements Plan—P-90
Pulp, Paper—L-11
  Sulphite—M-52

— Q —

Quartz, Crystals—M-146

— R —

Radios and Phonographs—PS-83, PS-84, L-44, L-44-a
Radiosondes—P-38
Railroads, Cars—L-97-a, L-97-a-1
  Repairs—P-88
Rails, Relaying—L-88
Razors and Blades—L-72, L-72-a
Refrigerants, Chlorinated—M-28
Refrigeration, Installations—L-38
Refrigerators, Ice—L-7 to L-7-b
  Mechanical—L-5, L-5-c, PS-102
  Mechanical, Resale—PS-110
  Mechanical, Used—PS-139
Relays, Electrical—P-15
Repairs, Air Conditioning—P-126
  Air Transport—P-47
  Aluminum Plants—P-120
  Canning Plant—P-115
  Chemical Industry—P-89
  Copper Fabricating Plant—P-106
  Dairy Processors—P-118
  Elevator—P-72
  Farm Equipment—P-32
  Foundry—P-31
  General—P-22, P-100
  Magnesium Plants—P-120
  Metal Refineries—P-73
  Mining—P-56
  Plumbing and Heating—P-84
  Railroads—P-88
  Refrigeration—P-126

Steel Industry—P-68
Utilities—P-46
Research—P-24, P-43
Resins, Synthetic—M-25
Retenone—M-133
Retreads and Recaps—L-61, PS-66
Rhodium—M-95
Rubber—M-119
Chlorinated—M-46
Conservation—M-15, M-15-a, M-124
Hand Truck Tires—L-111
Products—M-15-b
Retreads—L-61
Synthetic—M-153, M-13
Tires and Tubes—M-15-b, M-15-b-1, M-15-c, M-15-e, PS-63

— S —

Safety Equipment—L-114
Scrap, Aluminum—M-1-c, M-1-d, P-12, PS-2
Brass Mill—PS-12
Copper—P-61, PS-20
Lead—M-72, PS-70
Magnesium—M-2-b
Molybdenum—M-110
Nickel—M-6-b, M-6-c, PS-8
Rails—L-88
Steel—M-24
Tin—M-24-a, M-24-b, M-72
Zinc—PS-3
Service Stations—M-68-c
Sewing Machines, Domestic—L-98
Ships, Conversion—P-10
Merchant—P-7
Shipways—P-14-a, P-14-b
Shotguns—L-55
Signs, Metal—L-29
Sodium Nitrate—M-62
Solenoid Assemblies—P-15
Sperm Oil—M-40
Steam Boilers—L-102
Equipment—L-117
Steel—PS-6
Alloy—M-21-a
Beds and Mattresses—L-49
Castings—PS-41
Chrome—M-21-d
Conservation—M-126
Ferromanganese—PS-138
Heat Resistant—M-21-d
High Speed—M-14
Nickel Bearing—M-5, M-5-a, M-5-b
Plate—M-21-c, Gen. Alloc. No. 1
Plate for Welding Classes—P-92
Products—M-21, M-21-a, M-21-b, M-21-c, M-21-d, M-21-e, M-21-f
Resale—PS-49
Scrap—M-24
Shot and Bullet Core—M-21-f
Tin Plate—M-21-e
Tungsten—M-14
Used Drums—PS-43
Vanadium—M-23-a
Warehouses—M-21-b
Wrought Iron—M-21-a
Stokers, Domestic—L-75
Sulphur—M-132

— T —

Tackle Blocks—P-75
Tanks, Military—P-25-a to P-26-e
Tantalum—M-156
Telephones—L-50
Tin—M-43, M-43-a, PS-17
Cans—M-86, M-86-a, M-81, M-113
Foil—L-25
Plate—M-21-e, M-104, M-116
Scrap—M-72
Tubes—M-115
Titanium Dioxide—M-44
Pigments—PS-98
Toluene—M-34
Tools, Cutting—E-2, E-2-a, E-3, P-18, P-18-a
Toys—L-81
Tractors, Track Laying—L-53, L-53-a
Trailers—L-1, L-1-a, L-1-c, L-1-d, L-1-e, L-1-f, M-100, P-54, P-107, L-69
Trucks—L-1, L-1-a, L-1-c, L-1-d, L-1-e, L-1-f, L-3-e, L-3-f, L-4, L-4-a, L-4-c, L-35, M-100, P-35, P-54, P-57, P-107
Armored—P-35
Brightwork—L-69
Industrial Lift—P-40
Tung Oil—M-57
Tungsten—M-3, M-3-a, M-29, M-29-a, M-29-b
Steel—M-14
Turbines—M-76
Typewriters—L-54 to L-54-b

— V —

Vacuum Cleaners—L-18, L-18-a, L-18-b, PS-111
Vacuum Tubes—L-76
Vanadium—M-23, M-23-a
Vending Machines—L-27, L-27-a

— W —

Warehouses, General—L-63
Steel—M-21-b
Washing Machines—PS-86
Welding, Electrodes—P-85
Training Supplies—P-92
Windows, Metal—L-77
Wire, Cable—PS-82

— Z —

Zinc—PS-81
Allocation—M-11
Dust—M-11-a
Oxide—M-11-a
Rolled—PS-124
Scrap—PS-3
Sulphide—M-128

Directory of the War Production Board

Chairman ..... Donald M. Nelson
Vice-President ..... Henry A. Wallace
Administrator, Office of Price Administration ..... Leon Henderson
Special Assistant to the President Supervising Defense Aid Program ..... Harry Hopkins
Lieutenant-General in Charge of War Department Production ..... William Knudsen
Secretary of the Navy ..... Frank Knox
Federal Loan Administrator ..... Jesse Jones
Secretary of War ..... Henry L. Stimson
Director of Labor Division ..... Sidney Hillman

WPB, Executive Office of the Chairman

Office	Name	Room & Bldg.	Ext.
CHAIRMAN	Donald M. Nelson	5039 Soc.Sec.	2114
Assistants to the Chairman	Sidney J. Weinberg	5403 Soc.Sec.	2193
	E. A. Locke, Jr.	5613 Soc.Sec.	2585
	A. C. C. Hill, Jr.	5613 Soc.Sec.	3383
Special Advisor to Chairman	Floyd B. Odlum	230 Tempo D	2126
Executive Secretary	G. Lyle Belsley	5514 Soc.Sec.	2223
Ass't Executive Secretary		5514 Soc.Sec.	2223
Director, Progress Reports	Stacy May	2700 Soc.Sec.	2410
Ass't Director, Progress Reports	R. R. Nathan	3520 Soc.Sec.	2505
Chairman, Planning Committee	R. R. Nathan	3520 Soc.Sec.	2505
Executive Director, Planning Committee	Edward T. Dickinson, Jr.	3520 Soc.Sec.	3357
Chairman, Requirements Committee	William L. Batt	5300 Soc.Sec.	2212

WPB, Divisions of Industry Operations

DIRECTOR	James S. Knowlson	5079 Soc.Sec.	71211
Special Ass't to Director	John J. Hall	5624 Soc.Sec.	3184
Ass't Director in Charge of Plans and Programs	Blackwell Smith	5607 Soc.Sec.	2448
Executive Officer	Sidney Sherwood	5616 Soc.Sec.	5726
Ass't to Executive Officer	Carl K. Tranum	H-155 Tempo E	72017

Bureau of Field Operations:

CHIEF	L. E. Scriven	W8,F2 Tempo E	72092

Bureau of Governmental Requirements:

CHIEF	Maury Maverick	H-301 Tempo E	3585

Bureau of Industrial Conservation:

CHIEF	Lessing J. Rosenwald	3006 RRB	71592
Deputy Chief	Paul C. Cabot	3008 RRB	2882
Conservation & Substitution Branch, Chief	Harvey A. Anderson	3112 RRB	2850
Salvage Branch		3008 RRB	2882
Simplification Branch, Chief	Howard Coonley	3213 RRB	3041
Specifications Branch, Chief	C. L. Warwick	3102 RRB	3155

Bureau of Industry Branches:

CHIEF	Philip D. Reed	5006 RRB	3394
Deputy Chief	Amory Houghton	4006 RRB	3141
Air Conditioning & Commercial Refrigeration Branch, Chief	J. M. Fernald	P'thouse RRB	72059
Automotive Branch, Chief	Ernest Kanzler	Detroit	
Automotive Branch, Deputy Chief	L. R. Vaniman	4014 RRB	2955
Bldg. Materials Branch, Chief	Leighton H. Peebles	2204 NPO	5638
Construction Mach. Branch, Acting Chief	Joseph F. Ryan	W6,F3 Tempo E	71142
Containers Branch, Chief	Douglas Kirk	5118 RRB	
Farm Machinery & Equip. Branch, Chief	Wm. Tracy	H-341 Tempo E	3260
Gen'l Industrial Equipment Branch, Chief	Charles S. Williams	H-385 Tempo E	5811
Health Supplies Branch, Chief	William M. Bristol, Jr.	4088 RRB	
Plumbing & Heating Branch, Chief	W. W. Timmis	4613 RRB	
Printing & Publishing Branch, Acting Chief	George A. Renard	321 Tempo E	5785
Pulp & Paper Branch, Chief	David J. Winton	3311A RRB	3151
Rubber & Rubber Products Branch, Chief	Dr. Harry Rogers	W5,F5 RRB	71349
Safety & Technical Equipment Branch, Chief	Dr. E. R. Shaeffer	4058 RRB	6615
Special Industrial Machinery Branch, Chief	L. S. Greenleaf	H-359 Tempo E	
Transportation Equipment Branch, Chief	Andrew Stevenson	4311A RRB	2531

Bureau of Priorities:

CHIEF	C. H. Matthiessen, Jr.	5079 Soc.Sec.	2646
Deputy Chief in Charge of Review and Approval	John P. Gregg	5627 Soc.Sec.	2101
Chairman, Clearance Committee	John P. Gregg	5627 Soc.Sec.	2101
Chief, Curtailment Order Review Branch	E. J. Kirlin	5193 Soc.Sec.	71083
Chief, Review & Approval Branch	Stanley L. Phraner	W6,F2 Tempo E	3201
Ass't Chief in Charge of Curtailment Orders	Arthur Harris	5620 Soc.Sec.	72075
Ass't Chief in Charge of Priority Specialist	Samuel S. Stratton	5716 Soc.Sec.	2926
Ass't Chief in Charge of Internal Changes	Clem C. Crossland	H-135 Tempo E	2551
Reports Section, Chief	Irwin Frank	W2,F1 Tempo	4581
Information & Expediting Section, Chief	J. B. Henry	H-143 Tempo E	3241
Control Section, Chief	E. J. Baxter	H-131 Tempo E	2603
Operations Section, Chief	E. J. Baxter	H-131 Tempo E	2603
Ass't Chief in Charge of Priorities Enforcement	L. J. Martin	H-203 Tempo E	4986
Compliance Branch, Chief	J. H. Ward	W1,F2 Tempo E	3355

Inventory & Requisitioning Branch, Chief	Ernest A. Tupper	W8,F1 Tempo E	2413
Ass't Chief in Charge of Requirements	H. P. Nelson	5627 Soc.Sec.	4712
Distributors Branch, Chief	Linford C. White	H-239 Tempo E	5777
Maintenance & Repair Branch, Chief	Dean Gallagher	H-247 Tempo E	5879
Production Requirement Branch, Chief	A. L. Williams	H-227 Tempo E	
Ass't Chief in Charge of Policy	John H. Marlin	5718 Soc.Sec.	3194
Procedural Consultant	E. V. Russ	W5,F2 Tempo E	3101

WPB, Materials Division

DIRECTOR	A. I. Henderson	5300 Soc.Sec.	2212
Deputy Director		2061 Tempo R	2577
Executive Ass't to Director	C. E. Rhetts	5300 Soc.Sec.	2215
Executive Ass't to Deputy Director	George T. Elliman	2053 Tempo R	71201
Administrative Officer	J. M. Schaffer	2067 Tempo R	71701
Combined Raw Materials Board, Chairman	William L. Batt	5300 Soc.Sec.	2215
U. S. Executive Secretary	H. C. Sykes	3051 Soc.Sec.	3921
Aluminum & Magnesium Branch, Chief	A. H. Bunker	2003 Tempo R	2257
Chemicals & Allied Products Branch, Chief	Ernest W. Reid	2020 Tempo R	2262
Copper Branch, Chief	H. O. King	1013 Tempo R	72927
Cork & Asbestos Branch, Chief	Fred W. Gardner	1516 Tempo R	4682
Iron & Steel Branch, Chief	Reese Taylor	2081 Tempo R	2844
Manganese & Chrome Branch, Chief	Andrew Leith	1508 Tempo R	3201
Mica - Graphite Branch, Chief	Howard P. Wierum	1517 Tempo R	3552
Mining Branch, Chief	Dr. Wilbur A. Nelson	W1,F1 Tempo E	3341
Miscellaneous Minerals Branch, Chief	Richard J. Lund	1103 Tempo R	3595
Nickel Branch, Chief	Harry A. Rapelye	1003 Tempo R	72751
Stockpile & Shipping Branch, Chief	Dr. W. Y. Elliott	2001 Tempo R	2575
Power & Communications Branch, Chief	J. A. Krug	1025 Tempo R	2374
Tin-Lead Branch, Chief	Erwin Vogelsang	1503 Tempo R	4662
Tungsten & Molybdenum Branch, Chief	Harris K. Masters	1540 Tempo R	2543
Zinc Branch, Chief	David A. Uebelacker	1021 Tempo R	26294

WPB, Production Division

DIRECTOR	W. H. Harrison	5037 Soc.Sec.	2134
Special Ass't to Director	George H. Wilde	5040 Soc.Sec.	3397
Tax Amortization Section, Staff Head	Edward A. Sippel	2628 Soc.Sec.	5978
Aircraft Branch, Chief	Merrill C. Meigs	4008 Soc.Sec.	2266
Construction Branch, Chief	W. V. Kahler	4616 Soc.Sec.	4038
Contract Distribution Branch, Chief	Walter H. Wheeler	462 Ind. Ave.	71154
Ordnance Branch, Chief	E. F. Johnson	4303 Soc.Sec.	71111
Shipbuilding Branch, Ass't Chief	Capt. J. O. Gawne, USN	4075 Soc.Sec.	4059
Staff Services Branch, Chief	George A. Landry	4705 Soc.Sec.	4967
Tools Branch, Chief	George C. Brainard	4057 Soc.Sec.	2236

WPB, Bureau of Field Operations

The Field Offices:

Priorities district managers—PDM
Contract distribution managers—CDM
Chairman of advisory committees—CAC
State director of contract distribution—SD

State and City	Name	Title	Address	Telephone
Alabama				
Birmingham	Martine J. Lide	PDM	Phoenix Bldg.	7-3915.
	L. E. Geohegan	CDM		4-7761.
	Edw. L. Norton	CAC		
Arizona				
Phoenix	Lee G. Browne	PDM	Security Bldg	4-7101.
	William I. Walsh	SD		
	A. F. Moriarty	CAC		
Arkansas				
Fort Smith	Frank P. DeLaselere	CDM	13 North 7th St.	8916.
	C. W. MacDonald	PDM	Kelley Bldg.	
Little Rock	Charles S. Christian	PDM	Rector Office Bldg.	
	Alfred M. Lund	SD		
	Alfred M. Lund	CDM		4-5511.
	Charles. E. Thompson	CAC		
California				
San Francisco	James A Folger	PDM	1355 Market St.	Underhill 3301.
	Col. Francis M. Smith	CDM		K'ondike 2-2300.
Fresno	H. A. Mattern	CDM	Mattei Bldg.	Fresno 4-5119.
Los Angeles	A. R. Thomas	PDM	Western Pacific Bldg.	Prospect 7531.
	Watt L. Moreland	CDM	1031 South Broadway	Richmond 1261.
Oakland	W. P. Collins	CDM	Financial Center Bldg.	Templebar 6830.
San Diego	Paul C. Farmer [1]	CDM	Union Bldg.	Franklin 8907.
Sacramento	Orlando McCraney	CDM	Farmers & Mechanics Bldg.	2-5808.
Colorado				
Denver	Virgil L. Board	PDM	U. S. National Bank Bldg.	Main 4231.
	Clyde Hartzell	SD		
	El Roy Nelson	CDM		Main 4231.
	Wm. L. Petrikin	CAC		
Pueblo	D. F. Stalker	CDM	Star Journal Bldg.	
Connecticut				
Hartford	Edwin L. Howard	PDM	11 Asylum St.	7-9251.
	Earle L. Milliken	SD	Phoenix Bank Bldg.	7-9251.
	Earle L. Milliken	CDM		
	Carl Gray	CAC		
Bridgeport	Raymond L. French [1]	CDM	144 Golden Hill St.	4-9441.
New Haven	Chas. A. Newton	CDM	Liberty Bldg.	7-5891.
Delaware				
Wilmington	Bradley L. Geist	CDM	Penn Bldg.	4-8871.
Florida				
Jacksonville	George H. Andrews	PDM	Lynch Bldg.	50693.
	Chas. C. McCubbin	SD		
	Chas. C. McCubbin [1]	CDM		5-1149.
Miami	Forrest D. Banning [1]	CDM	Congress Bldg.	3-0756.
Tampa	Herbert Brennan	PDM	Wallace South Bldg.	M-8461.
	Arthur B. Hale	CDM		
Georgia				
Atlanta	John B. Reeves	PDM	116 Candler Bldg.	Jackson 5880.
	J. V. Booth [1]	CDM		
Idaho				
Boise	L. O. Johnson	CDM	409 Capital Securities Bldg.	409.
Illinois				
Chicago	Edmund H. Eitel [1]	PDM	20 North Wacker Drive	Andover 3000.
	Joseph Overlock	SD		
	Thomas N. Wynne [1]	CDM		
	Clarence Alvidsen	CAC		
Decatur	G. E. Hale [1]	CDM	Standard Office Bldg.	2-7012.
Peoria	Ralph W. Pritchard [1]	CDM	Alliance Bldg.	8623.
Springfield	Edward Gerrity	CDM	Leland Office Bldg.	3-6211.
Indiana				
Evansville	Vincent Terry [1]	CDM	Koenig Bldg.	3-5406.
Fort Wayne	George A. Dinnen	CDM	Utility Bldg.	Anthony 8415.
Indianapolis	Albert O. Evans	PDM	Circle Tower Bldg.	Market 9411.
	Frank Hoke	SD		
	Harry S. Rogers [1]	CDM		
	J. M. Smith	CAC		
South Bend	Howard E. Richardson	CDM	City National Bank Bldg.	2-1411.
Iowa				
Des Moines	Geo. Beese	SD	Crocker Bldg.	4-1909.
	Geo. Beese [1]	CDM		
	Vernon L. Clark	CAC		
Kansas				
Wichita	Harold Hartzell	SD	Union National Bank Bldg.	5-8551.
	Harold Hartzell	CDM		
	George B. Weeks	CAC		
Kentucky				
Louisville	James T. Howington	PDM	Todd Bldg.	Wabash 6553.
	Prentiss M. Terry	SD		
	Prentiss M. Terry	CDM		
Louisiana				
New Orleans	Louis House Clay	PDM	Canal Bldg.	Raymond 2312.
	R. E. Judd	SD		
	R. E. Judd	CDM		
	A. B Paterson	CAC		Raymond 7731.
Shreveport	John B. Ferchaud	CDM	916 Giddens Lane Bldg.	2-9303.
Maine				
Bangor	Charles E. Walker [1]	CDM	44 Central St.	Banger 6300
Portland	Herbert Payson, Jr.	SD	Congress Bldg.	
	Herbert Payson, Jr. [1]	CDM	142 High St.	2-0194.
Maryland				
Baltimore	T. M. Chandlee	PDM	Baltimore Trust Co.	Plaza 8170.
	G. W. Creighton	SD		
	G. W. Creighton	CDM		
	W. F. Roberts	CAC		
Massachusetts				
Boston	W. P. Homans	PDM	17 Court St.	La-4250.
	Edward V. Hickey	SD		La-7500.
	Edward V. Hickey	CDM		
Fall River	Harold S. Ramsay [1]	CDM	27 South Main St.	7-9306.
Lowell	W. E. Stanwood [1]	CDM	Sun Bldg., 8 Merrimac St.	Lo-6788.
Springfield	H. G. Philbrook	CDM	95 State St.	2-7493 & 4.
Worcester	Dwight C. Daniels	CDM	State Mutual Bldg.	6-4671.
Michigan				
Detroit	James F. Wilson	PDM	7310 Woodward Ave.	Trinity 1-5800.
	Stoner Yantis	CDM		
Grand Rapids	Herman Pleasant	CDM	Michigan National Bank Bldg.	6-5373.
Iron Mountain	George Wallner	CDM	Commercial National Bank Bldg.	1400.
Minnesota				
Duluth	Arthur J. Newman	CDM	Federal Bldg.	Melrose 2396.
Minneapolis	Willard F. Kiesner	PDM	Midland Bank Bldg.	Main 3244.
	Earl Pitney	CDM		
	Roger Shepard	CAC		

[1] Acting manager.

State and City	Name	Title	Address	Telephone
Mississippi				
...kson	A. G. McIntosh [1]	CDM	Tower Bldg.	3-4062.
Missouri				
...nsas City	Charles B. Shaeffer	PDM	Mutual-Interstate Bldg.	Victor 7780.
	R. W. Webb	CDM		
...Louis	Ward H. Goodloe	PDM	Paul Brown Bldg.	Central 3200.
	F. J. McDevitt	CDM		
Montana				
...lena	Oscar A. Baarson	PDM	Power Block House	3270.
	Howard Bogie	CDM	Power Block Annex	
Nebraska				
...maha	Victor H. Black	PDM	Grain Exchange Bldg.	Jackson 6466.
	Arthur Walker	SD		
	W. Ralph Morgan	CDM		
Nevada				
...no	Edwin S. Bender [1]	CDM	Saviers Bldg.	2-4833.
New Hampshire				
...anchester	Thomas Hagan	SD	Amoskeag Industries Bldg.	2031.
	Daniel S. Hickey [1]	CDM		
New Jersey				
...ewark	R. L. Kennedy	SD	Globe Bldg.	Market 2-0700.
	R. L. Kennedy	CDM		
	Thomas R. Jones	CAC		
...amden	Frederick Cohen [1]	CDM	Broadway Stevens Bldg.	Camden 9075.
...enton	R. Emmett Carroll	CDM	City Center Bldg.	2-4155.
New Mexico				
...buquerque	George Lusk	SD	103½ West Central Ave.	6641.
	George Lusk [1]	CDM		
New York				
...bany	F. J. Holman	CDM	Standard Bldg.	5-1749.
...ooklyn	Emile Z. Weinberg	CDM	16 Court St.	Main 4-0306.
...ffalo	Paul R. Smith	PDM	M & T Bank Bldg.	Mad. 3160.
	Thos. J. O'Rourke	CDM		
...w York City	Sydney Hogerton	PDM	Chanin Bldg.	Murray Hill 3-2520.
	W. O. Crabtree	CDM		Murray Hill 3-6810.
...chester	Mahlon Gregg	CDM	Commerce Bldg.	Stone 3007.
...racuse	T. D. Harter	CDM	Starrett Syracuse Bldg.	2-1343.
...ica	Earle R. Mason	CDM	First National Bank Bldg.	
North Carolina				
...arlotte	J. E. MacDougall	PDM	Liberty Life Bldg.	3-6194.
	Eugene C. Ochsenreiter	CDM	New Liberty Life Bldg.	7811.
	Robert M. Hanes	CAC		
...leigh	Irving F. Hall	SD	Sir Walter Hotel Bldg., P. O. Box 2658.	3-1901-2-3.
North Dakota				
...marck	Paul W. Fawcett [1]	CDM	14 First National Bank Bldg.	174.
Ohio				
...ton	E. Oscar Kuendig	CDM	Commercial Bldg.	3-9104.
...cinnati	Elmer C. Henlein	PDM	34 East 4th St.	Cherry 3740.
	Thomas Grace [1]	CDM	Union Trust Bldg.	
	Clifford Wright	CAC		
...veland	G. A. Moore [2]		Union Commerce Bldg.	Cherry 5975.
	Howard Porter	PDM		
	C. R. Terry	SD		
	Henry F. Jordan	CDM		
	Herman Lind	CAC		
...lumbus	B. C. Zuhars [1]	CDM	513 East Town St.	Main 6573.
...yton	Harold B. Doty	PDM	3d National Bank Bldg.	Hemlock 6321.
	Collins Wight [2]	CDM		
...edo	Alvin E. Buchenberg	CDM	Security Bank Bldg.	Garfield 9583.
...ungstown	Leif Oyen	CDM	Union National Bank Bldg.	3-0415.
Oklahoma				
...homa City	C. F. Aurand	PDM	Key Bldg.	7-1551.
	Morton R. Harrison	SD		
	Morton R. Harrison [1]	CDM		7-2456
	Fred Jones	CAC		
...sa	John H. Keys	CDM	Kennedy Bldg.	2-3274.
	Alfred E. Ballin	PDM		2-3284.
Oregon				
...tland	John G. Barnett	SD	Bedell Bldg.	Atwater 7241.
	John Fred Bergesch	PDM		
	John G. Barnett [1]	CDM		
	Thomas H Banfield	CAC		
Pennsylvania				
...stown	Ernest R. Follin, Jr. [1]	CDM	506 Hamilton St.	3-7405.
...ster	Abbott Smith	CDM	12-14 East 5th St.	Chester 6207.
...	Harry B. Joyce [1]	CDM	Erie Trust Co. Bldg.	24-123.
Harrisburg	Ritchie Lawrie, Jr. [1]	CDM	Doehne Bldg., 24 South 4th St.	41157.
Johnstown	John S. Wagoner	CDM	U. S. National Bank Bldg.	6-1251.
Lancaster	Arthur K. Barnes	CDM	Woolworth Bldg.	2-0011.
Norristown	Felix P. Cross	CDM	Norristown Penn Trust Co.	6760.
Philadelphia	George McGovern	PDM	Broad Street Suburban Station Bldg.	Locust 3400.
	Orville H. Bullitt	SD		
	Orville H. Bullitt	CDM		
	Thos. S. Gates	CAC		
Pittsburgh	Charles F. Cruciger	PDM	Fulton Bldg.	Grant 2962.
	Charles E. Rofinson	CDM		Grant 3790.
Reading	John A. Archer [1]	CDM	615 Penn St.	4-4901.
Scranton	J. P. Eyre Price [1]	CDM	First National Bank Bldg.	4-6158.
Wilkes-Barre	W. H. Pierce	CDM	53 West Market St.	9068.
Williamsport	Fred J. Livingston	CDM	Susquehanna Trust Co. Bldg.	9142-3.
York	Richard S. Cole	CDM	25 North Duke St.	7881.
Rhode Island				
Providence	Walker Mason	SD	Industrial Trust Bldg.	Dexter 4684.
	Arthur J. Minor [1]	CDM		
	Col. Wm. Shawcross	CAC		
South Carolina				
Columbia	D. E. McDuffie [1]	CDM	Manson Bldg.	2-8646.
South Dakota				
Sioux Falls	Fred M. Chase [1]	CDM	Boyce Creely Bldg.	1146.
Tennessee				
Chattanooga	Paul E. Shacklett	CDM	James Bldg.	6-4745.
Knoxville	D. K. Porteous [1]	PDM	Goode Bldg.	3-0791.
	W. W. Mynatt [1]	CDM		4-2944.
Memphis	John K. Lester	PDM	Sterick Bldg.	5-7421.
	Arthur M. Field	CDM		
	Arthur M. Field	SD		
	Arthur J. Dyer	CAC		
Nashville	George S. Gillen	PDM	Stahlman Bldg.	5-8525.
	W. G. Whitsitt	CDM		5-7378 & 9
Texas				
Dallas	John B. Joyce	PDM	Fidelity Bldg.	Riverside 4651.
	A. J. Langford	CDM		
El Paso	Robert Stryker	PDM	El Paso National Bank Bldg.	Main 2881.
	L. A. Wilke	CDM		
Houston	George L. Noble, Jr.	PDM	Electric Bldg.	Capital 7201
	C. J. Crampton	SD	1016 Walker Ave.	
	I. M. Griffin	CDM	Electric Bldg.	
San Antonio	Carl Pool	PDM	Majestic Bldg.	Fannin 1475.
	P. E. Locke	CDM		Fannin 5321.
Utah				
Salt Lake City	Ralph E. Bristol	PDM	248 South Main St.	3-7676.
	Bayard W. Mendenhall [1]	CDM	David Keith Bldg.	
	Geo. M. Gadsby	CAC		
Vermont				
Montpelier	A. M. Creighton, Jr. [1]	CDM	12 State St.	1410.
	Lester E. Richwagen	SD		
Virginia				
Norfolk	J. L. Mason [1]	CDM	Dickson Bldg.	5-1654.
Richmond	F. P. Wilmer	PDM	10 South 5th St.	7-2331.
	J. L. Mason	SD		
Roanoke	J. L. Mason [1]	CDM	113 Kirk Ave., SW	3-4421.
Washington				
Seattle	William D. Shannon	PDM	White-Henry-Stuart Bldg.	Elliot 0-200.
	Harry J. Martin	SD		
	Harry J. Martin [1]	CDM		Main 2155-6.
	J. G. Larson	CAC		
Spokane	Lars Carlson	CDM	Old National Bank Bldg.	Main 3521.
West Virginia				
Charleston	John A. Kennedy	SD	Capital City Bldg.	27-282.
	John A. Kennedy	CAC		
	E. J. McCees	CDM		
Clarksburg	Alex H. Cooper	CDM	Empire National Bank Bldg.	1460-1.
Huntington	Frank Enslow	CDM	West Virginia Bldg.	29316-7.
Wheeling	E. C. Drake	CDM	Fidelity Bldg.	27-232.
Wisconsin				
Appleton	Paul W. Romig	CDM	341 W. College Ave.	7003.
Eau Claire	Dorance W. Walters	CDM	128½ Graham Ave.	2-1395.
Madison	John D. Howard	CDM	Washington Bldg.	Gifford 5234-5.
Milwaukee	Frank J. Tharinger	PDM	Plankinton Bldg.	Bdwy. 4440.
	Clifford E. Ives	SD		
	Lyman E. Wheeler	CDM		
	Harold H. Seaman	CAC		
Wausau	Ray Miller	CDM	408 3d St.	6548.
Wyoming				
Casper	W. F. Wilkerson	SD	Box 1211	3196.
	R. G. Corbett	CDM		
Puerto Rico				
San Juan	G. W. Foote [3]	CTP	Bldg. B, Stop 8	

[1] Acting manager.
[2] Supervising analyst. [3] Chief, territorial possessions.

Description of Priority Orders

(See "PRIORITY ORDER 'PD' FORMS," page 24, for description of forms listed under column Related Form. Numbers in brackets refer to effective date)

"M" Orders

Order Number	Subject	Related Form
M-1	Aluminum (3-22-41). *Superseded by M-1-f*	
M-1-a	Supplement—schedule of ratings (3-11-41). *Superseded by M-1-f*	
M-1-b	Supplement, modifies M-1 and M-1-a with respect to low grade deliveries (4-11-41). *Superseded by M-1-c*	
M-1-c	Supplement—directs distribution of scrap and secondary aluminum (6-10-41). *Revoked by M-1-d*	
M-1-d	Segregation of aluminum scrap by content and form made mandatory, beginning 3-1-42 (1-7-42). *Revokes M-1-c and P-12*. Amendment No. 1 (5-2-42) places firmer control over segregation and sale of aluminum scrap.	
M-1-e	Prohibits aluminum use except on war work and certain specific items (1-23-42)	
M-1-f	All aluminum allocation controls centered in this order, to simplify administration (2-17-42). *Supersedes M-1, M-1-a*	PD-8, PD-26-a, PD-39, PD-40, PD-97, PD-114
M-1-g	Allocates aluminum paint and pigment (3-10-42). *Expires Dec. 31, 1942.*	PD-312, PD-313
M-2	Magnesium (3-24-41). *Superseded by M-2-b*	
M-2-a	Supplement (3-24-41). *Superseded by M-2-b*	
M-2-b	Supplement — extends control over scrap, dead stock, etc. (11-14-41). *Supersedes M-2, M-2-a*. Extension of order, (4-25-42) until Oct. 31, 1942.	PD-26-m, PD-40-m, PD-173, PD-184
M-3	Tungsten (3-26-41). *Revoked by M-29.*	
M-3-a	Supplement (3-26-41), preference rating schedule. *Revoked by M-29*	
M-4	Neoprene (3-28-41). *M-4 expired 6-30-41; included under provisions of M-13.*	
M-5	Nickel-bearing steel (4-10-41). *Revoked by M-21.*	PD-10, PD-11, PD-17, PD-18
M-5-a	Supplement (4-10-41). *Revoked by M-21.*	PD-27
M-5-b	Supplementary order (6-17-41). *M-5, M-5-a, M-5-b, revoked by M-21-a*	
M-6	Nickel (5-15-41). *Revoked by M-6-a*	
M-6-a	Primary nickel (9-30-41). *Supersedes M-6*. Amendment (3-30-42) redefines nickel for broader coverage and extends order until revoked.	PD-27, PD-31, PD-27
M-6-b	Curtails use of nickel; sets controls over scrap, secondary metal (1-20-42). *Expires when revoked.* MRC purchase of frozen nickel stocks excepted from price schedules (5-1-42).	
M-6-c	Requires segregation of and controls melting (4-22-42). *Expires when revoked.*	PD-149, PD-150, PD-151, PD-394
M-7	Borax and boric acid (6-9-41). *M-7 expired 8-30-41*	
M-8	Cork (5-31-41)	PD-28, PD-29, PD-51
M-8-a	Cork end products (10-1-41). Interpretation No. 1 (10-16-41) covering insulation board. Amendment No. 1 (3-26-42) brings imports under control; other changes. *Expires when revoked.*	PD-196, PD-384
M-9	Copper (5-29-41). *Superseded by M-9-a*	
M-9-a	Establishes full priority control over copper (8-2-41). (Revised 1-7-42). Interpretation No. 1 (2-19-42) covers warehouse deliveries and certain completed products. Amendment limiting shipments to ratings of A-1-c or higher (5-7-42). *Supersedes M-9. Expires June 30, 1942.*	PD-12, PD-37, PD-59, PD-60, PD-60-a, PD-227
M-9-b	Copper scrap and copper base alloy scrap (10-1-41). *Expires when revoked.* Supplement; prohibits scrap shipments without specific WPB authorization (12-31-41). *Revokes P-61.* Amendment (3-31-42) covers use by public utilities and extends order until revoked.	PD-130, PD-121, PD-130, PD-226, PD-249
M-9-b	Amended (5-9-42). To include ingots and provide for monthly reports.	
M-9-c	Curtails use of copper in certain items (10-21-41). Amended (11-1-41). Amended (1-3-42). Exempts health supplies from restrictions.	PD-167, PD-169, PD-172, PD-189

Order Number	Subject	Related Form
	Interpretation No. 1 (12-26-41) covering radio industry. M-9-c-1 (1-23-42) restricts brass use in shoe making	PD-259, PD-260
	Amendment (2-28-42) permits copper use by railroads under specified conditions.	PD-261
	Interpretation No. 2 (3-28-42) clarifies use of bronze powder in printing and publishing.	
	Amendment (4-9-42) freezes copper screening including uncut rolls in hands of retailers.	
	Amended (5-7-42) prohibits use of copper and its alloys in civilian products, curtails other uses June 15, and lists other restrictions. *Expires when revoked...*	PD-167, rev. PD-426
	Amended (5-15-42) to aid sales of frozen stocks to brass or wire mills without authorization.	
	Int. No. 3 (5-19-42) forbids use of copper products to attach saw blades.	
M-9-c-2	Permits use of plated or alloyed copper by jewelry industry until May 15. Then supplies must be sold to MRC (4-4-42). *Expires when revoked.*	
M-10...	Polyvinyl chloride (6-9-41). *Expires when revoked.*	PD-7, PD-33
	Amendment No. 2 (4-29-42) allocates all rubber substitutes.	PD-36
M-11...	Zinc; sets up reserve pool (7-1-41).	PD-20
	Amendment (10-16-41) gives specific shipping instructions.	PD-50-a, PD-62, PD-94
M-11...	Amended. Sets up metallic zinc allocation plan (5-1-42)	PD-94-a, PD-450
M-11-a.	July zinc pool (7-1-41)	
M-11-b.	Aug. zinc pool (8-1-41)	
M-11-c.	Sept. zinc pool (9-1-41)	
M-11-d.	Oct. zinc pool (10-1-41)	
M-11-e.	Nov. zinc pool (11-1-41)	
M-11-f.	Dec. zinc pool (12-1-41)	
M-11-g.	Jan. zinc pool (1-1-42)	
M-11-h.	Feb. zinc pool (2-1-42)	
M-11-i.	Mar. zinc pool (3-1-42)	
M-11-j.	April zinc pool (3-28-42)	
M-11-k.	May pool (5-1-42)	
M-11-a.	Amended. Places zinc oxide and dust under pool plan (5-1-42).	
M-13...	Synthetic rubber (includes Neoprene) (6-9-41)	PD-7, PD-33
	Amendment No. 1 (12-31-41) establishes allocation.	PD-36
M-14...	Tungsten high speed steel (6-11-41)	PD-101
	Amendment No. 1 (11-29-41) further restricts use.	
	Amendment No. 2 (12-31-41) covers class A and B steels.	
M-15...	Rubber conservation (6-20-41).....	PD-49-a
M-15-a.	Supplement (6-27-41). July limitations. Amendment (8-4-41).	
	Amendment — white sidewall tires (8-8-41). Amendment (11-12-41).	
M-15-b.	Rubber limitation order covering new tires (12-11-41).	
	Amendment No. 1 (12-19-41) extends ban, except for A-3 orders or higher. *Expires 1-5-42.*	
	Amendment No. 2 (12-27-41), re: fire hose. *Expires when revoked.*	
	Amendment No. 3 (1-20-42) further restricts use. *Expires when revoked.*	
	Amendment No. 4 (2-19-42) permits use of scrap rubber for certain items.	
	Amendment No. 5 (3-1-42) revises list of prohibited products.	
	Amendment No. 6 (3-20-42) restricts rubber, latex, reclaimed rubber, and scrap inventories, and restricts destruction of rubber.	
	Amendment No. 7 (3-30-42) further restricts use of crude rubber and latex.	
	Amendment No. 8 (4-11-42) prohibits manufacture of blowout shoes and restricts manufacture of reliners.	
	Amendment No. 9 (4-27-42) limits use of scrap and reclaimed rubber.	
M-15-b-1.	Specifications for use in certain products (2-11-42).	
	Amendment No. 1 (3-25-42) revises lists 6 and 7 for crude rubber for truck tires.	
	Amendment No. 2 (3-25-42) includes insulated wire and cable in order.	
	Amendment No. 3 (4-3-42) permits manufacture of passenger car capping stock entirely from reclaimed rubber together with small quantity of crude.	
	Amendment No. 4 (4-11-42) restricts use and sale of rubber as insulation on electrical wires as of May 1, 1942.	
	Amendment No. 5 (5-6-42) gives specifications for feeding nipples, effective 5-15-42.	
M-15-c.	Restricts transactions in rubber tires, casing and tubes	PD-216
	Amendment No. 1 (1-2-42) establishes further restrictions on tires, tubes and casings.	
	Amendment No. 2 (1-3-42) permits certain purchases.	
	Amendment No. 3 (1-20-42) covers sale to foreign governments.	
	Amendment No. 4 (1-15-42) covers tires for 10-year old trucks.	
	Amendment No. 5 (1-21-42) clarifies restrictions.	
	Amendment No. 6 (2-13-42) covers airbags used by retreaders and recappers.	
	Amendment No. 7 (2-16-42) covers transfer of tires.	
M-15-e.	Permits certain transfers of tires from one vehicle to another, or to a warehouse (2-16-42).	
M-16...	Tricresyl and triphenyl phosphates (8-30-41).	
M-17...	Pig iron (8-1-41)	PD-69, PD-70
	Amendment revises date of filing of monthly reports (10-14-41).	PD-71-a-b-c

Order Number	Subject	Related Form
	Amendment No. 2 and Extension No. 2 (4-28-42) places pig iron under allocation. *Expires when revoked.*	PD-69, PD-70, PD-71, PD-71-d
M-18	Chromium (7-7-41) ... *Revoked by M-18-a.*	PD-53-a, PD-53-b, PD-54, PD-55
M-18-a	Extends priority controls on chromium, limits chromium oxide content of chemicals (11-29-41).	PD-53-a
	Amendment No. 1 (1-13-42). Prohibits melting more than 2 tons of ferrochrome monthly without permission.	PD-53-b
	Amendment No. 2 (2-4-42) prohibits melting without specific WPB permission. *Revokes M-18. Expires June 30, 1942.*	
M-18-b	Restricts use of chromium for chemical purposes. Does not cover metallurgical and refractory uses (4-26-42). *Expires when revoked.*	PD-54
M-19	Chlorine (7-26-41). *Expires when revoked.*	PD-158-b-c, PD-159-a-b-c
	Amendment No. 1 (12-20-41) establishes full allocation after 2-1-42.	PD-190, PD-191
	Amended (2-25-42). Sets up further restrictions; assigns specific ratings.	
	Amendment No. 1 (3-9-42) postpones effective date to April 1.	PD-277
	Amendment No. 2 (3-30-42) postpones effective date to May 1, 1942. *Expires when revoked.*	
	Amended (5-1-42) to remove the reports requirements.	PD-190
	Correction (5-22-42) permits users to accept specified deliveries and advances filing date of orders.	
M-20	Calcium-silicon (7-29-41). *Revoked by M-20-a.*	
M-20-a	Calcium-silicon allocation established (11-29-41). *Supersedes M-20*	PD-72
M-21	Steel (8-9-41) ...	PD-73, PD-75, PD-99
	Amendment (9-9-41) prohibits delivery unless PD-73 has been filed.	PD-100, PD-169
	Amendment No. 2 (12-1-41) clarifies PD-73 export filing procedure.	
	Amendment No. 3, Extension No. 2 (4-22-42) restricts deliveries to A-10 ratings or better after May 15; abolishes PD-73. *Expires when revoked.*	PD-138, PD-139
	Amendment No. 4 (4-28-42) requires filing PD-73 with purchase orders until June 1, and other provisions.	PD-73
	Amendment No. 5 (5-25-42) permits sale on unrated orders of certain wire products and corrugated roofing.	
M-21-a	Supplement—relating to alloy iron, alloy steel and wrought iron (9-16-41).	
	Amendment No. 1 (11-25-41). Sets restrictions on production and sale of steel and iron with more than 3 per cent Cr.	
	Amendment No. 2 (12-20-41). Prohibits melting alloy iron and steel containing specified elements except for orders rated A-10 or higher. *M-5, M-5-a, M-5-b, revoked by M-21-a.*	
	Amendment No. 3 (5-11-42) sets monthly alloy iron and steel melting schedules. Related forms: PD-391, PD-391-a, PD-440.	
M-21-b	Supplement—relating to steel warehouses (9-3-41) ...	PD-83-a to PD-83-f
	Directive; assigns A-9 rating to warehouse requirements (9-26-41).	
	Amendment No. 1 (10-14-41).	
	Amendment No. 2 (1-1-42). Revises method of establishing quarterly quotas.	
	Amendment (2-28-42) prohibits acceptance of deliveries in excess of quotas.	
	Amendment No. 4 (5-4-42) restricts deliveries to A-10 ratings or better; imposes inventory restrictions. Related forms: PD-83-a, PD-83 of rev., PD-83-g. *Expires when revoked.*	
	Amendment No. 5 (5-25-42) permits unrated sales of certain wire and sheet products and changes warehouse quota basis on wire products.	
M-21-c	Allocates steel plate (3-9-42) ...	PD-169, PD-169-a, PD-298, PD-299
M-21-d	Supplement (12-27-41). Restricts shipments of corrosion or heat resistant alloy iron or steel with more than 4 per cent Cr. *Expires when revoked.*	
	Amendment No. 1 (3-27-42) revises restrictions on use and shipments on corrosion or heat resistant iron or steel. *See also M-18-b.*	
M-21-e	Sets up quota system for tin plate; reduces tin use; incorporates restrictions of orders M-38, M-43-a (2-3-42).	PD-221
	Amended (5-18-42) banning use of tin and terne plate except for specified products.	
M-21-f	Allocates shot and bullet core steel (2-17-42) ...	PD-201, PD-307, PD-308
	Amendment No. 1 ((5-26-42) allocates steel for 90 mm. armor piercing shot.	
M-23	Vanadium (8-14-41). *Revoked by M-23-a.*	
M-23-a	Sets allocations for vanadium, inc. ores, concentrates, ferro-alloys, pentoxide, scrap, etc. (12-20-41). *Revokes M-23. Expires June 30, 1942.*	PD-84, PD-209
M-24	Scrap iron and steel (10-11-41) ...	PD-149, PD-150, PD-151
	Amendment No. 1 (5-23-42) permits consumer stocks to be built up.	
M-24-a	Restricts sale of tinned and detinned scrap in certain California areas, except for copper precipitation (3-4-42). *Expires when revoked.*	
M-24-b	Orders segregation of tin scrap from other scrap for delivery to mills (4-22-42). *Expires when revoked.*	

Order Number	Subject	Related Form
M-25	Formaldehyde, paraformaldehyde, hexamethylene-tetramine and synthetic resins (8-23-41). Amendment (8-28-41) clarifies ratings on resins. Amendment No. 2 (10-1-41). Amendment No. 3 (11-17-41) covers radio tube bases. Amendment No. 4 (11-17-41) clarifies ratings on synthetic resins. Amendment No. 5 (12-31-41) covers flashlights. Amendment No. 6 (3-16-42) covers embalming use.	
M-27	Phenols (8-30-41) ..... Amended (11-10-41) controls distribution of phenols. *Expires July 31, 1942.*	PD-178-a-b PD-180
M-28	Chlorinated hydrocarbon refrigerants (8-22-41) ..... Amended (12-31-41).	PD-160 PD-161 PD-162 PD-163 PD-164
M-29	Tungsten (8-31-41). *Revokes M-3, M-3-a. Expires June 30, 1942.*	PD-9
M-29-a	Supplement (10-13-41); exempts purchasers of 100 lb. or less of tungsten monthly from reporting requirements. *Expires June 30, 1942.*	PD-9
M-29-b	Prohibits tungsten use in grinding wheels, gages and as coloring material for rubber, linoleum, paper, etc., after 5-1-42. Other restrictions set up (2-14-42).	
M-30	Ethyl alcohol and related compounds (8-28-41). Amendment No. 2 (1-7-42). Further restricts use and encourages substitution of corn or grain for molasses in production. Amendment No. 3 (1-22-42) defines ethyl alcohol and restricts deliveries. *Expires when revoked.*	
M-31	Methyl alcohol (8-28-41). Amendment (11-12-41) concerning residual supply. Amended (12-19-41). Relaxes certain restrictions. Amendment No. 2 (12-31-41). Prohibits use as an anti-freeze agent; assigns B-8 rating for certain uses. Amendment No. 4 (3-31-42) extends time of controls and specifies ratings. *Expires July 31, 1942.*	
M-32	Potassium perchlorate (8-28-41).	
M-33	Potassium permanganate (8-28-41).	
M-34	Toluene (8-28-41) ..... Amendment No. 1 (12-30-41) establishes full allocation beginning Feb. 1, 1942. *Expires when revoked.* Amendment No. 2 (5-22-42) requires maximum extraction of toluene from all base materials.	PD-223 PD-224
M-35	Phosphorus oxychloride (8-30-41).	
M-36	Manila fiber and manila cordage (8-29-41). *Expires when revoked.* .. Amendment (8-14-31). Amendment No. 2 (12-19-41) sets further instructions on cordage sales. Amendment No. 3 (2-20-42) further restricts processing and sales. Interpretation No. 1 of amendment No. 3 includes all manila cordage in U. S. *Expires when revoked.* Amendment No. 4 (3-7-42) limits amount that may be sold until Aug. 1, 1942. Amendment No. 5 (4-1-42) clarifies quota restrictions in regard to defense orders.	PD-128 PD-129
M-38	Lead allocation established, pool provided (10-4-41)	PD-66 PD-66-a PD-124
M-38-a	Nov. lead pool (11-17-41).	
M-38-b	Dec. lead pool (12-1-41).	
M-38-c	Curtails use of lead in specified products (1-10-42). Amendment No. 1 (4-6-42) prohibits use of lead foil for specified uses on May 1.	
M-38-d	Jan. lead pool (1-1-41).	
M-38-e	Feb. lead pool (2-10-42).	
M-38-f	Mar. lead pool (2-28-42).	
M-38-g	April lead pool (3-30-42).	
M-38-h	May lead pool (5-1-42).	
M-39	Cobalt (11-4-41) ..... Allocation established (2-7-42).	PD-152 PD-153
M-39-a	Cobalt supplement (12-5-41). Waives certain forms.	
M-39-b	Restricts cobalt use in certain items (2-7-42).	
M-40	Sperm Oil (8-16-41)	PD-185
	Amendment No. 1 (5-16-42) sets up allocation control of sperm oil..	PD-481 PD-482
M-41	Chlorinated solvents, including carbon tetrachloride, trichlorethylene, perchlorethylene and ethylene dichloride (10-15-41). *Expires May 15, 1942.* ..... Amended (5-2-42) changing ratings for all permitted uses. *Expires when revoked.*	PD-127
M-43	Tin; control established over supplies, inc., afloats and imports. Purchases of less than 5 tons exempted (12-17-41). *Expires July 31, 1942.* ..... Amendment No. 1 (1-13-42). Reduces exemption to 3 tons a month; re-defines term "distributer." *Expires July 1, 1942.* Amendment No. 2 (4-10-42) restricts sale of tin bearing solder, babbitt, and tin oxide.	PD-213
M-43-a	Restricts use of tin (12-31-41). *Expires when revoked.* ..... Amendment No. 1 (2-14-42) freezes stocks of tin and tin bearing material in jewelers' hands. Amended (3-17-42) to further restrict use in such items as solder, jewelry, tin plate, etc. *Expires when revoked.* Amended (3-17-42) requiring government agencies to conform to special restrictions. *Expires when revoked.* ..... Amendment No. 1 (4-4-42) revises tin use limitations to include auto body solder. *Expires when revoked.*	PD-229 PD-229

Order Number	Subject	Related Form
	Amendment No. 2 (4-10-42) removes limitations on uses of tin for war implements. *Expires when revoked.*	
M-44	Titanium dioxide use as pigment restricted; pool established (1-1-42)	PD-145
	Amendment (1-7-42). Clarifies regulations.	PD-146
	Amendment No. 2 (1-7-42) clarifies regulations.	
	Amendment No. 3 (1-24-42). Producers' pool increased 5 per cent.	
	Amendment No. 3 (2-1-42) sets reserved quota percentage at 25 per cent. *Expires when revoked.*	
M-45	Sheet steel inventory for export drums. *See P-76. Expires when revoked.*	PD-154
	Amendment No. 1 (12-31-41) permits use of any gage sheet and eliminates restrictions on type of product which may be exported in such containers.	PD-155
	Amendment No. 2 (5-25-42) includes cold rolled sheets under terms of order.	
M-46	Chlorinated rubber (11-1-41). *Expires when revoked.*	PD-143
	Amendment No. 1 (2-23-42) freezes stocks; exceptions listed.	PD-144
M-47	Burlap placed under full allocation, inc. imports (12-22-41). See order for effective date on import shipments. *Expires when revoked.*	PD-186, PD-187
	Amendment No. 1 (12-31-41) provides for disposition.	PD-188
	Interpretation No. 1 (1-13-42) defines importing phrases.	
	Amendment No. 2 (1-19-42). Permits certain users to process small amounts.	
	Amendment No. 3 (2-16-42) covers certain agricultural uses of burlap bags.	
	Amendment No. 4 (3-4-42) removes restrictions on amount of burlap brought into country by non-importing companies and restricts use of burlap.	
M-49	Iridium use in jewelry curtailed (12-12-41). *Expires Nov. 30, 1942.*	
M-50	Restricts use of jewel bearings and materials (1-14-42). *Expires when revoked.*	PD-235, PD-236
	Amendment No. 1 (2-28-42) establishes additional restrictions....	PD-235, PD-236
M-52	Sulphite pulp allocation order; pool provided (1-9-42). *Expires May 1, 1942.*	PD-198
	Amendment No. 1 (1-22-42) concerning Rayonier, Inc.	
	Amendment No. 2 (2-5-42) supplementary order.	
	Amendment No. 3 (2-1-42) revises Feb. allocations; lists Lend-Lease needs.	
M-53	Restricts use and deliveries of printing ink (3-30-42).	PD-344
M-57	Tung oil (1-8-42).	
	Amendment No. 2 (3-19-42) relaxes certain restrictions on use and sale. *Expires 3-19-42.*	
	Amended (4-15-42) to include otiticica oil under M-57. *Expires when revoked.*	
M-58	Allocates glycerin deliveries over 50 lbs. (3-31-42). *Expires when revoked.*	PD-361, PD-362, PD-363
M-59	Directs distribution of palm oil (3-20-42). *Expires when revoked.*	PD-355
M-60	Restricts use of oils with high lauric acid content (3-31-42)	PD-354
	Amendment No. 1 (5-11-42) permits restricted use by food manufacturers.	
M-61	Orders all flake graphite of crucible quality be used for making crucibles; subjects crucible making to control (2-17-42)	PD-303-a
	Interpretation No. 1 defines Madagascar flake graphite; designed to avoid interrupting ladle stopper manufacture (3-23-42).	PD-303-b
M-62	Full allocation control placed on sodium nitrate (1-13-42). *Expires when revoked.*	
M-63	Establishes control over imports of antimony, cadmium, chromium, copper, graphite, plumbago, kyanite, lead, quicksilver, rutile, tungsten, vanadium, zinc, zirconium (12-28-41). *Expires when revoked.*	PD-222-a, PD-222-b
	Amendment (1-9-42). Graphite, plumbago, removed from list; lead added. *Expires when revoked.*	
	Amendment No. 2 (1-13-42). Following material added to control list: Hides and skins, asbestos, rapeseed oil, cocoanut, palm and tung oil and copra. *Expires when revoked.*	
	Amendment No. 3 (3-14-42) removes certain restrictions on cadmium, zinc, lead ores.	
	Amendment No. 4 (4-8-42) keeps private purchasers out of foreign markets for critical materials. *Expires when revoked.*	PD-222-c
	Amendment No. 5 (5-4-42) adds certain items to private import restrictions.	
	Amendment No. 6 (5-22-42) controls imports of all known commercial oils.	
M-65	Cadmium placed under full priority control (1-17-42). *Expires June 30, 1942.*	
	Amendment No. 3 (3-11-42) directs distribution of certain materials.	
M-65-a	Curtails use of cadmium in certain items (1-17-42). *Expires when revoked.*	
M-66	Cashew nut oil placed under full priority control (1-13-42).	
	Amendment No. 1 (5-14-42) prohibits use of the shell oil in brake lining manufacture.	
M-67	Suppliers of plumbing, heating, electrical supplies (wholesale and retail) placed under Production Requirements Plan (1-3-42) *Expires when revoked.*	PD-1-x, PD-25-a
	Revoked by L-63 (4-6-42).	
M-68	Restricts use of materials for building new oil and natural gas wells (12-23-41). *Expires when revoked.*	PD-214-a, PD-214-b
	Amendment No. 1 (1-14-42). Permits completion of wells in process of drilling on 12-23-41.	PD-214-c

Order Number	Subject	Related Form
	Amendment No. 2 (1-28-42) refers to wells spudded before 12-23-41.	
	M-68-1 (2-13-42) permits drilling in specified areas. *Expires when revoked.*	
	Amendment No. 3 (2-18-42) covers well spacing. *Expires when revoked.*	
	Interpretation (2-7-42) covering foreign countries.	
	Amendment No. 4 (5-21-42) clarifies jurisdiction of order.	
M-68-c.	Prohibits construction of new facilities, including filling stations (1-14-42). *Expires when revoked.*	PD-215
	Interpretation (2-7-42) covering foreign countries.	
	Amendment (3-23-42) modifies original restrictions.	
	Amendment No. 1 (5-21-42) clarifies jurisdiction of order.	
M-69...	Distilled beverages, making curtailed (1-10-42). *Expires when revoked.*	
	Supplement No. 1 (1-16-42) supersedes paragraph C.	
	Supplement (2-20-42) prohibits distilleries from producing spirits for beverages.	
	Amendment No. 1 (4-25-42) allocates 100 to 189 proof beverage alcohol.	
M-70...	Restricts use of Jute from India (2-27-42)	PD-318 PD-319
	Amendment No. 1 (4-16-42) includes imported raw jute under order; defines "import."	
	Amendment No. 2 (5-1-42) restricts use for yarns in April.	
	Amendment No. 3 (4-30-42) prohibits use in manufacture of rugs, carpets and linoleum for civilian use. Relaxed by telegram (5-8-42).	PD-222-b
M-72...	Limits delivery of tin and lead scrap (1-8-42).	
	Amended (5-18-42) revising restrictions on tin and lead scrap delivery	PD-249 PD-254
M-75...	Allocates diphenylamine	PD-262 PD-263 PD-266
M-76...	Establishes land turbine production schedules (3-9-42). *Expires when revoked.*	
M-79...	Curtails use of asbestos from South Africa (1-20-42). *Expires when revoked.*	PD-251 PD-252
	Amendment No. 1 (2-28-42) covers use of high temperature pipe coverings.	PD-253
M-81...	Curtails use and manufacture of tin cans (2-11-42)	PD-269
	Telegraphic amendment (2-20-42) suspends certain provisions.	
	Telegraphic amendment (2-25-42) permits delivery of certain cans already manufactured.	
	Interpretation No. 1 (3-13-42) on tin and terne plate.	
	Amendment No. 1 (4-6-42) limits packing of condensed soups after June 30.	
	Amendment No. 2 (4-30-42) extends use of tin plate of certain sizes and extends indefinitely telegraphic exceptions.	
	Amended (5-1-42) to extend use of tin plate in food canning.	
M-82...	Hempseed distribution controls (1-23-42). *Expires when revoked.*	
M-84...	Agave fibre distribution controlled (2-20-42). *Expires when revoked.*	
	Telegraphic amendment (2-23-42) revises Feb. schedule.	
	Amendment No. 2 (3-21-42) defines ternes and includes certain items. *Expires when revoked.*	
	Amendment No. 3 (4-13-42) prohibits use of Java sisal for certain purposes; changes inventory restrictions.	
	Amendment No. 4 (4-20-42) permits manufacture of twine from Java sisal put into process before April 20, 1942.	
	Amendment No. 5 (4-22-42) permits extended manufacture of binder twine.	
M-85...	Kapok distribution controls (2-4-42).	
	Amendment No. 1 (3-16-42) revises deadline for dealers' sales and redefines certain war requirements. *Expires when revoked.*	
	Amendment No. 2 (4-30-42) prohibits use as industrial refrigeration insulation and as stuffing for civilian maritime equipment.	
M-86...	Directs canners to set aside certain quantities for war use (3-14-42). *Expires when revoked.*	PD-342 PD-343
M-86-a.	Announces quantities of 1942 pack to be set aside for war use (3-14-42). *Expires 12-31-42.*	PD-342 PD-343
	Amendment No. 1 (4-13-42) requires canners to meet requirements for exporting canned goods to armed forces.	
	Amended order clarifies that grade preference in 1942 Military and Lend-Lease packs take preference over can-size preference (5-25-42)	PD-342 PD-343
M-89...	Corundum allocated (2-7-42)	PD-293 PD-294
M-95...	Prohibits rhodium use in jewelry (3-11-42). *Expires Dec. 31, 1942.*	PD-295 PD-296
	Amendment No. 1 (4-17-42) prohibits all use of rhodium in jewelry. *Expires 12-31-42.*	
M-96...	Directs distribution of agar (2-9-42).	
M-97...	Removes inventory restrictions to encourage stocking of coal and coke (2-13-42).	
M-100..	Rationing order covering light, medium, heavy trucks, truck-trailers and trailers. (2-28-42). *Expires when revoked.*	PD-310
M-104..	Controls use of tin and terne plate as glass closures (4-3-42). *Expires when revoked.*	
	Amendment No. 1 (4-23-42) restricts manufacture of crown caps in April	PD-384
	Amendment No. 2 (4-25-42) revokes Amendment No. 1 and permits output of caps to extent of available cork until May 1, when production stops.	

Order Number	Subject	Related Form
M-105	Controls distribution of naphthalene as of June 1 (5-6-42)	PD-434, PD-435, PD-436
M-108	Restricts use of enamels, oils, lacquers, resins, or gums as exterior can coatings (3-23-42).	
M-109	Requires inventory reports on industrial diamonds (3-27-42)....	PD-376, PD-377
	Amendment No. 1 (4-13-42) postpones filing date.	PD-378
M-110	Sets up molybdenum allocation, including scrap. Users of less than 50 lb. monthly exempted from reporting requirements. (3-18-42). *Expires 12-31-42.*	PD-358, PD-359, PD-360
	Amendment No. 1 (3-24-42) postpones effective date to May 1.	
M-112	Sets up antimony allocation and antimony alloys (3-30-42). *Expires 12-31-42.*	PD-380, PD-381
M-113	Permits canners to build up supply of packing boxes for 1942 needs (3-23-42). *Expires when revoked.*	
M-115	Restricts use of collapsible tin, tin coated, and alloy tubes (4-1-42). *Expires when revoked.*	
	Amendment No. 1 (5-11-42) appoints Tin Salvage Institute, Newark, to handle tin recovery. Amended (5-20-42) to require sale of tubes to Tin Institute.	
M-116	Prohibits manufacture or coating closures with enamel on exterior surfaces when closures are made of tin or terne plate (4-4-42). *Expires when revoked.*	
	Amendment No. 1 (4-20-42) postpones effective date to April 30, 1942.	
M-119	Prohibits use of rubber on glass containers for certain products. *Expires when revoked.*	
M-123	Restricts deliveries of asbestos textiles (3-30-42). *Expires when revoked.*	
M-124	Rubber conservation order (3-28-42).	
	Amendment No. 1 (4-1-42) extends use of elastic thread.	
	Amendment No. 2 (4-29-42) extends and amends order.	PD-433
M-126	General iron and steel conservation order (5-5-42). *Expires when revoked.*	PD-437
	Interpretation No. 1 (5-23-42) clarifies order in regard to beds, bed springs and mattresses, overlapped by L-49.	
M-128	Producers zinc sulphide pigment pool: prohibits export (5-6-42). *Expires when revoked.*	PD-464
M-132	Directs sulphur inventories and deliveries (4-18-42). *Expires when revoked.*	
M-133	Controls supply and directs distribution of rotenone (4-13-42). *Expires when revoked.*	
M-137	Halts use of benzol or benzene in motor fuel after 30 days (4-20-42). *Expires when revoked.*	
M-142	Naphthenic acid allocation control.	PD-438, PD-439
M-143	Allocates Indian kyanite and other refractory materials (5-6-42). *Expires when revoked.*	PD-466
M-144	Cancels all preference ratings assigned to fuel oil purchases: Provides sales may be made without regard to any ratings. *Expires when revoked.*	
M-146	Control of quartz crystal distribution.	PD-484, PD-485
M-148	Sets up export program to other American republics (5-12-42).	
	Amendment No. 1 (5-15-42) removes farm equipment from schedule A.	
M-149	Removes phosphate rock inventory restrictions (5-11-42). *Expires when revoked.*	
M-150	Limits aromatic petroleum solvent deliveries used in paint and protective coatings to conserve toluol and xylol (5-26-42).	
M-153	Allocates acrylonitrile, a synthetic rubber (5-14-42).	
M-156	Complete allocation control of tantalum.	PD-487, PD-488, PD-489

How to Use This Guide

To determine what priority or price controls are in effect on a product, or material used by the metal working industry, first locate this product in the alphabetical index on page 2. This index will show all orders affecting the product. Locate these references in the list of orders (P Orders, M Orders, etc.) on pages 6 to 23.

These lists of orders will tell, briefly, the nature of any order affecting the metal working industry, when it went into effect, what forms to use to operate under the order and what preference rating has been assigned by the orders.

To determine the nature of the various forms which must be filed to operate under an order (these are listed under the column "Related Forms"), refer to the section, "Forms to Use with Priority Orders" on page 24.

If you want help or information on an order, inquire at the nearest priority field office, listed on pages 3 to 5.

If you want to know on what grounds WPB will grant relief from the terms of various curtailment and conservation orders, see page 32.

"P" Orders

Order Number	Material Covered	Related Form	Rating Assigned
P-1	Material for production of electric traveling cranes (3-12-41). *Revoked by P-5*		A-1-c
P-2 to P-2-s	Material for production of machine tools (3-28-41). *Revoked by P-11*	PD-6	A-1-a
P-3	Material for production of airframes (4-29-41). *Superseded by P-109*	PD-13	A-1-d
P-4	Material for production of airplane engines and propellers (4-29-41). *Superseded by P-109*	PD-14	A-1-c
P-5	Material entering into production of cranes and hydraulic bridge brakes (5-26-41). *Revokes P-1. See P-5-a* Amendment (6-14-41).	PD-6	A-1-a
P-5-a	Material for production of cranes and hoisting equipment (8-1-41). *See P-5-b*		A-1-a
P-5-b	Material for production of cranes and hoisting equipment (10-1-41). *Supersedes P-5-a* Extension of order (4-21-42) to July 1, 1942.	PD-81, PD-81-a, PD-88	A-10 or higher
P-6	Defense supplies rating plan (5-31-41). *Superseded by P-90*		
P-6-a	Civil aircraft, repair parts and accessories (7-21-41) Amendment (10-27-41). Amendment No. 2 (1-3-42) extends rating to Civil Air Patrol and police agencies.	PD-25-c-1, PD-25-c-2	A-10
P-7	Material and equipment entering into production of merchant ship construction (6-12-41). Interpretation No. 1 (4-3-42) restricts ratings to certain materials and tools.	PD-30, PD-30-a	A-1-a 1941, A-1-b 1942, A-1-c 1943
P-8	Material for freight car construction (6-18-41). Amendment No. 1 (11-29-41) explains reports to be filed. Interpretation No. 1 (2-3-42) limits use of rating to material to be physically incorporated into freight cars. Extends (3-16-42) order until April 30, 1942... *Expired 4-30-42.*	PD-38, PD-38-a	A-3
P-9-a, P-9-b, P-9-c, P-9-d, P-9-e, P-9-f, P-9-g	Material for aircraft parts. *Superseded by P-109.*	PD-81, PD-81-a	A-1-b

*As assigned on merits of each application.

Order Number	Material Covered	Related Form	Rating Assigned
P-10	Material and equipment entering into conversion of ships (6-19-41)...	PD-41, PD-41-a	AA
P-11	Material for production of metal working equipment (7-1-41). *Superseded by P-11-a*		
P-11-a	Material for production of metal working equipment (9-30-41). *Revokes P-11*	PD-81, PD-81a, PD-88, PD-115	A-1-a, b, c
P-12	Aluminum scrap (6-26-41). *Revoked. See M-1-c*	PD-40	A-10
P-13	Material for production of Curtiss Wright airframes (7-3-41). *Superseded by P-109*	PD-52, PD-52-a	A-1-b
P-14-a	Material and equipment for construction of shipways in 1941 (7-12-41)	PD-56, PD-56-a	A-1-a
P-14-b	Material and equipment for construction of shipways in 1942 and 1943 (7-12-41)	PD-56, PD-56-a	A-1-b 1942
P-15	Material for electrical relays and solenoid assemblies (7-11-41). *Superseded by P-109*	PD-57, PD-57-a	A-1-d
P-16	Material for commercial radio receiving, transmitting and directional equipment (7-11-41). *Revoked 1-28-42*	PD-58, PD-58-a	A-1-c
P-17	Material for production of canning machinery (7-9-41). *Expired 8-31-41. See P-42, 42-a and 51*		A-2
P-18	Material entering into production of cutting tool equipment (7-31-41). *Revoked by P-18-a*		
P-18-a	Material for production of cutting tools (8-28-41). *Supersedes P-18.. Expired Feb. 28, 1942.*	PD-6, PD-81 Rev.	A-1-a
P-19	Material for construction of defense projects outside of U. S. (7-18-41)	PD-200	
P-19-a	Material for construction of defense projects (limited to the Priorities Critical List) (7-18-41). Check with WPB before using as to whether this order or P-19 applies before using Amendment No. 1 (5-23-42) restricts rated material to that physically incorporated in defense projects.	PD-68, PD-68-a	*
P-19-b	Material for construction of certain defense projects (7-30-41)	PD-68, PD-68-a	*

Order Number	Material Covered	Related Form	Rating Assigned
P-19-c	Material for specified publicly financed defense houses with protected delivery dates. Amendment No. 1 (4-20-42) permits material supplier to extend rating within 3 months after he may apply it.	PD-68, PD-68-a	*
P-19-d	Material for privately financed housing projects (9-9-41). Amendment No. 1 (4-20-42) permits material supplier to extend rating within 3 months after he may apply it.		*
P-19-e	Material for highway projects (10-18-41). Amendment No. 1 (3-16-42) prohibits use of ratings for road building machinery. Amendment No. 2 (5-9-42) permits ratings for material for temporary constructions.	PD-81	*
P-19-g	U. S. housing projects (does not cover copper or pipe) (12-31-41)	PD-81	
P-19-h	Provides defense housing builders with simplified method of extending ratings on any rated project (3-4-42).	PD-200, PD-200-a	
P-19-i	Assigns ratings for deliveries to builders and suppliers, for rated construction projects. Interpretation No. 1 (5-6-42) controls suppliers deliveries to magnesium and aluminum plants under construction.	PD-81, PD-81-a	*
P-20	Material for construction of specified locomotives (7-21-41). Amendment No. 1 (11-29-41) clarifies reports to be filed. Interpretation No. 1 (2-3-42) limits use of ratings to material physically incorporated in locomotives. Extends order (3-16-42) until April 30, 1942. *Expired 4-30-42.*	PD-64, PD-64-a PD-352	A-3 A-3
P-21	Material for repair and rebuilding steam, electric or diesel locomotives for railroad, mining and industrial use. (7-21-41). Amendment No. 1 (11-29-41) explains reports to be filed. Interpretation No. 2 (2-3-42) limits use of ratings to material physically incorporated into locomotives. Extends order (3-16-42) until April 30, 1942. *Expired 4-30-42.*	PD-65, PD-65-a PD-352	A-3 A-3
P-22	Repairs (9-9-41). *Superseded by P-100.*		
P-23	Materials for mining machinery (7-29-41). *Superseded by P-56-a*	PD-117	A-3
P-24	Material for experimental research work (8-5-41)	PD-74, PD-74-a	A-1-b
P-25-a	Parts, accessories and equipment for light tanks (8-11-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-f
P-25-b	Light tanks, spare parts and accessories (8-11-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-f
P-25-c	30 cal. and 37 mm. guns for light tanks (8-11-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-f
P-25-d	Gasoline and diesel engines for light tanks (8-11-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-f
P-25-e	Material for production of light tanks (10-14-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-f
P-26-a	Parts, equipment and accessories for medium tanks (8-11-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-d
P-26-b	Medium tanks, spare parts, accessories, etc. (8-11-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-d
P-26-c	37 mm. and 75 mm. guns for medium tanks (8-11-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-d
P-26-d	Gasoline and diesel engines for medium tanks (8-11-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-d
P-26-e	Material for production of medium tanks (10-14-41). Extension of order (3-16-42) until May 31, 1942. *Expired 5-31-42*	PD-81 PD-81	A-1-d

*As assigned on merits of each application.

Order Number	Material Covered	Related Form	Rating Assigned
P-29	Health supplies rating plan (8-25-41) ..... Amendment No. 1 (9-30-41). Revises list of health items. Amendment No. 2 (2-14-42) simplifies extension procedure.	PD-79, PD-81	A-10
P-31	Materials for production of foundry equipment and repair parts (9-5-41). *Expired May 30, 1942.*	PD-81	A-1-b
P-32	Parts for maintenance and repair of farm machinery (8-20-41). *Revoked by P-95*.....	PD-81, PD-82	A-10
P-33	Farm machinery and equipment (8-20-41). *Revoked by P-95*.....	PD-81, PD-88	
P-35	Material for armored half track vehicles (12-5-41) ..... Extends order (3-16-42) until May 31. *Expired 5-31-42.*	PD-81	A-1-f
P-38	Material for production of radiosondes (8-26-41) ..... Amendment No. 1 (2-18-42) extends coverage to indirect needs. Extends order until June 30, 1942 (4-29-42).	PD-6, PD-6-a	A-1-d
P-39	Material for production of arc and resistance welding machines (9-12-41) ..... Users of P-39 advised to make use of P-90 (3-9-42). *Expired May 1, 1942.*	PD-81	A-1-c
P-40	Material for industrial lift trucks (10-14-41).... Amendment No. 1 (12-30-41). Extends order to repair parts..... Extension (3-7-42) of order until May 10, 1942	PD-81 PD-25-a	A-1-g A-1-g A-1-g
P-41	Construction, maintenance, operation of facilities of Pan American Airways, Inc. (8-28-41)	PD-6	A-1-a
P-42	Material for production of canning machinery, equipment (8-21-41) ..... Amendment No. 1 (9-30-41). *Expired Mar. 12, 1942.*	PD-88, PD-93	A-3
P-42-a	Machinery and equipment of American Can Co. (9-12-41) ..... Amendment No. 1 (9-30-41).	PD-6, PD-6-a	A-7
P-43	Research laboratory supplies and equipment (8-28-41) ..... Interpretation No. 1 (1-23-42) prohibits use of order for construction or expansion.	PD-93, PD-88, PD-107	A-2
P-45	Material for fire-fighting apparatus (10-31-41) ..... Revised (2-28-42). Assigns A-2 rating for motorized apparatus..... Extension (4-13-42) of order until June 30, 1942.	PD-81 PD-81	A-2 A-2
P-45-a	Equipment, tools and supplies used by U. S. Forest Service (11-22-41)	PD-81	A-8
P-46	Repairs, maintenance for utilities (9-17-41). Amendment No. 1 (9-26-41). Covers inventories. Amendment No. 2 (10-25-41). Defines minor repairs. Amendment No. 3 (12-11-41). Prohibits certain expansions. Amendment, material necessary for utility repair, maintenance, and operating supplies (3-26-42). ..... Informal interpretation (5-19-42) restricting use of excess stocks in making electric extensions to housing projects.	PD-193-a, b, c; PD-194-a, b, c; PD-195-a, b, c	A-10 *
P-47	Maintenance, repair of air transport facilities (9-6-41) ..... Interpretation No. 1 (2-11-42) extends coverage to essential tools, equipment, etc.	PD-96	A-3
P-51	Machinery and equipment for Food Machinery Corp. (9-22-41)... Amendment No. 1 (11-14-41). *Expires Mar. 18, 1942.*	PD-6, PD-6-a	A-3
P-52	Material for aircraft accessories (9-15-41). *Superseded by P-109*..	PD-81, PD-108	*
P-53	Textile machinery repairs and maintenance (9-13-41) ..... Amended (12-4-41) concerning assignment procedure. Amendment No. 2 (2-28-42) covers repairs; raises rating to A-8.....	PD-81, PD-88	A-10 A-8
P-54	Material for specified types of trucks, passenger carriers, trailers (9-12-41) ..... Amendment No. 1 (12-31-41). Amendment No. 2 (1-23-42) clarifies order, subject to restrictions in L-1-a. Amendment No. 3 (4-2-42) defines off-the-highway vehicles. Amendment No. 4 and extension No. 6 (5-23-42) continues order until June 30, when PRP becomes effective.		A-3

*As assigned on merits of each application.

Order Number	Material Covered	Related Form	Rating Assigned
P-55	Defense housing projects (9-12-41) ..... Amended (1-12-42) to provide for use of Production Requirements Plan (P-90) by manufacturers supplying building material. Amended (3-3-42) simplifies extension of ratings. Amendment No. 1 (4-20-42) permits material supplier to extend ratings within 3 months after he may apply it.	PD-105, PD-105-b	.....*
P-56	Repairs for mines. *Revokes P-22 as provisions apply to mines* (9-22-41) ..... Amended (12-2-41) to cover all mining facilities. ..... Amendment No. 2 (5-15-42) eliminates reference to gold and silver mines from order. Amendment No. 3 (12-31-41) covers safety and defense equipment..... Amendment (3-3-42) revises ratings. Amendment No. 5 (4-13-42) grants higher ratings for explosives. Interpretation excludes use of A-1-c rating for operating supplies (4-28-42).	PD-119	A-1-a**, A-1-c, A-3, A-8, A-10 ..... A-3
P-56-a	Material for mining machinery (12-31-41). *Supersedes P-23*	PD-25-a, PD-81, PD-81-a	.....A-3
	Assigns high ratings to mining machinery manufacturers (4-14-42)..... Amendment (3-3-42) revises ratings. Amendment No. 2 (4-13-42) allows deliveries to South American copper mine operators under P-58, to steel producers under P-68, to smelters under P-73, and under P-65-a.....	PD-25-a	.....A-1-a PD-25-a
P-57	Replacement parts for passenger cars, light trucks (9-18-41) ..... Amendment No. 1 (1-23-42 and 2-12-42). Redefines "replacement parts." *See L-4.*		.....*
P-58	Supplies for specified South American mines (10-8-41) ..... Amended (2-14-42) to expedite deliveries.		.....A-3
P-61	Scrap for certain copper ingot makers, remelters (10-13-41). *Revoked by M-9-b*.....	PD-126	.....A-10
P-62	Material for laboratory equipment and reagent chemicals (11-15-41).. *Expired Mar. 31, 1942.*	PD-82, PD-93, PD-93-a	.....A-5

*As assigned on merits of each application.
**Emergency repairs only.

Order Number	Material Covered	Related Form	Rating Assigned
P-65	Material for producing marine paints (12-5-41)	PD-81, PD-81-a, PD-82	.....A-3
P-68	Maintenance and repair supplies for steel industry (10-31-41) .... Amendment No. 1 (1-8-42). Order extended to cover Canadian mills operating in U. S..... Amendment No. 2 (2-27-42) assigns rating for office equipment..... Amendment No. 3 (4-11-42) reclassifies ratings	PD-81, PD-148 PD-81, PD-228 PD-228	.....A-1-a to A-3 .....A-3 .....A-10 A-1-a, A-1-c, A-3
P-71	Material for privately financed dwellings for which foundations were in place 10-9-41 (12-23-41). *Expired Mar. 31, 1942.*	PD-81, PD-81-a, PD-105 rev., PD-135	.....A-10
P-72	Material for elevator and escalator repair parts (11-10-41) ..... Amendment (1-22-42). Extends order to Pan American countries....	PD-81, PD-82 PD-25-a	.....A-3
P-73	Repairs, maintenance, operating supplies for smelters and refiners of copper, lead, zinc, antimony, mercury and cobalt (12-22-41)	PD-212	.....A-1-a to A-3
P-74	Material for heat treating furnaces (11-22-41).. Interpretation No. 1 (1-1-42) extends coverage to material for repair parts. Extension No. 1 (5-11-42) until June 30 when rating holders must apply under PRP.	PD-81	.....A-1-c
P-75	Material for tackle blocks (10-24-41)	PD-82	.....A-1-c
P-76	Sheet steel for drums (11-17-41) ..... Amendment (12-31-42) extends use of rating to all types of sheets. *See M-45.*	PD-81, PD-154-a, PD-155-a, PD-156-a	.....A-4
P-77	Material for rebuilding machine tools (11-10-41)	PD-81, PD-81a, PD-157, PD-179	.....A-1-c
	Order extended (3-31-42) to May 1, 1942. Users advised to shift to PRP. *Expired May 1, 1942.*		
P-78	Material for conveying machinery (11-10-41). *Expired 1-31-42.* Producers advised (2-3-42) to apply under Production Requirements Plan	PD-81, PD-82 PD-25-a, PD-81, PD-82-a	.....A-3

Order Number	Material Covered	Related Form	Rating Assigned
P-79	Hardware for cooperage and wooden container industry (11-14-41)	PD-81 / PD-82	A-5 or A-8
	Revised (3-11-42) to include paper containers; rating for wire raised to A-7	PD-81 / PD-82	A-5 or A-7
	Amendment No. 1 (5-16-42) assigns high ratings for delivery of ferrous material used in non-metal food containers		A-1-c
P-82	Material for products made by blind (11-29-41)	PD-81 / PD-81-a / PD-166	A-8
P-83	Material stocked by petroleum industry suppliers (12-8-41) *Revoked April 16, 1942.*	PD-82 / PD-82-a	A-8
P-84	Material for plumbing and heating repairs (3-13-42)		A-10
P-85	Material for resistance welding electrodes (12-3-41)	PD-81 / PD-81-a / PD-82	A-1-c
P-86	Material for industrial explosives (12-12-41)	PD-81 / PD-81-a / PD-82	A-8
P-88	Material for railroad maintenance, repair and operation (3-16-42). *Supersedes P-8, P-21, and P-100*	PD-351 / PD-352	A-1-, A-3 and A-8
P-89	Maintenance, repair and operating supplies for chemical industry (1-23-42)	PD-81	A-1-a to A-3
	Amended (3-2-42) clarifying order and classifying ratings	PD-315	A-1-a / A-1-c / A-3
	Interpretation No. 1 of amended order defines "operating supplies" (3-27-42).		
	Amendment No. 1 (5-22-42) grants chemical plants high ratings for repair. *Expires June 30.*		
P-90	Production Requirements plan (effective first quarter, 1942). *Supersedes P-6*	PD-25-a, d, e, f, g	*
	Amended (1-30-42) to permit extension of AA ratings without special permission of WPB.		
	Amendment No. 1 (1-28-42) Modified Production Requirements Plan for businesses with annual sales volume of less than $100,000	PD-25-x	

*As assigned on merits of each application.

Order Number	Material Covered	Related Form	Rating Assigned
	Amendment (3-10-42) permits use of ratings assigned by other certificates.	PD-25-g	AA
	Application for 3rd quarter ratings will be on PD-25-a, revised, on old forms with specified changes.		
	Use of form PD-25-x eliminated after May 23 (5-15-42)	PD-25-x	
P-91	Material for elevators, escalators and dumbwaiters (12-30-41)	PD-25-a	A-2
P-92	Steel plate and electrodes for welders' training classes (1-17-42)	PD-183	*
P-94	Material for production of printing ink (3-30-42). *See also M-53*	PD-345	A-5
P-95	Material for farm machinery and parts (12-27-41). *Supersedes P-32, P-33. See L-26*	PD-25-a / PD-81 / PD-81-a	A-3
	Amendment No. 1 (3-30-42) includes irrigation and drainage equipment.		
	Amendment No. 2 (4-16-42) grants high ratings to certain manufacturers	PD-81 / PD-81-a	A-1-a
P-98	Material for petroleum industry (1-14-42). Does not apply to plants operating under P-43 or P-100		A-1-a to A-10
	Interpretation No. 1 (2-27-42) limits order to deliveries within U. S. and possessions.		
	Amendment No. 1 (2-20-42) permits use of A-8 or lower without countersignature for supplies of less than $500.		
	Amended (3-15-42) to cover office supplies and certain automotive equipment; other revisions.		
	Amended (5-16-42) to provide for new rating granting procedure to be announced before July 1. *Expired May 15, 1942.*		A-10
P-98-a	Extends rating assigned by P-98 to firms outside U. S. (1-21-42). *Revoked April 25, 1942.*		
P-100	Repairs, maintenance and supplies (12-18-41) *Supersedes P-22. See P. 46, P-56, P-68*		A-10
	Amendment (2-10-42) extends coverage to farm machinery and		

Order Number	Material Covered	Related Form	Rating Assigned
	specified Canadian producers. Interpretation No. 1 (2-13-42) restricts use of rating for certain critical materials in highway maintenance. Amendment No. 2 (3-9-42) extends order to refrigeration equipment in stores and restaurants. Interpretation No. 2 (3-23-42) does not include office equipment under ratings of order. Interpretation No. 3 (4-16-42) excludes uniforms and fire hose from use of rating under P-100.		
P-101	Material for making stitching and book binding wire (1-3-42).	PD-81, PD-82	A-8
P-103	Material for specified British refinery	PD-81, PD-81-a	A-1-c
P-103-a	Material for specified refinery issued to Standard Oil Co. (2-3-42). *Revoked April 25, 1942.*		
P-106	Material for repair, maintenance and operation of mills that roll, draw or extrude copper and copper alloys	PD-258	*
	Amended (5-14-42) to give A-1-c rating to suppliers to replenish certain inventories. *Expires June 30, 1942.*		A-1-c
P-107	Replacement parts for medium and heavy trucks, truck trailers and buses (1-22-42)		A-3
	Amendment No. 1 (3-5-42) revises rating to A-2. *See also L-35*	PD-25-a	A-2
P-108	Material for production of fire protective equipment (2-26-42)	PD-81-a, PD-82	A-3, A-7
	Extension (4-13-42) of order until June 30, 1942.		
P-109	Material for production of aircraft parts (2-20-42). *Supersedes P-3, P-4, P-9-a to P-9-g, P-13, P-15, P-52*	PD-81-a	A-1-a
	Amendment (3-11-42) abolishes distinction between material physically incorporated into product and other necessary material		A-1-a
	Amendment No. 1 (5-8-42) allows ratings to be extended for operating supplies		A-1-a
P-109-a	Material for trainer type aircraft (3-11-42)	PD-81-a	A-1-b
P-110	Material for low cost remodeling projects (4-8-42)	PD-406	A-5
P-115	Material for repairs and expansion of food canning plants (2-11-42)	PD-81-a, PD-285	A-1-a, A-3
P-118	Repairs, maintenance and operating supplies for dairy processers (4-18-42)	PD-413, PD-414	A-2, A-3
	Amendment No. 1 (4-27-42) restricts applications of ratings for use before June 30, 1942		A-2, A-3
P-120	Repairs, maintenance and operating supplies for aluminum and magnesium producers and basic fabricators (3-20-42)	PD-371, PD-372	A-1-a, A-1-c, A-1-j
P-122	Material for military and naval training aircraft not covered by P-109 (3-11-42)	PD-1, PD-1-a, PD-3, PD-3-a	A-1-a, A-1-b
P-126	Material for repairs to air conditioning and refrigerating equipment (4-20-42)	PD-399	A-1-a, A-3, A-8
P-129	Materials for radio and wire communication repairs, maintenance and operation (4-23-42)		A-3
P-130	Materials less than $50 used in normal construction caused by installations (4-23-42)		A-3

*As assigned on merits of each application.

How to Address Priority Reports and Inquiries

• • • If you are required to file a priority report or make an inquiry to WPB, address the envelope as follows: "Director of Industry Operations, New Social Security Bldg., Washington, D. C.—Ref. . . ." (insert here the number of the order concerned, as P-68, L-2, M-63, etc.). Using this procedure will speed handling of your letter in Washington. Avoid addressing communications to an individual as much as possible.

"L" Orders

Order Number	Subject
L-1	Restricts production of motor truck and public passenger carriers (8-30-41). *Related form, PD-95.* *Amended by L-1-a.*
L-1-a	Restricts production of medium motor trucks, truck trailers, passenger carriers and replacement parts (9-12-41). *Amends L-1.* Amendment No. 1 (12-4-41) removes restrictions on truck trailers. Amendment No. 2 (12-31-41) February quotas. Amendment No. 3 (3-1-42) aimed at boosting output of medium heavy trucks. Amendment No. 4 (3-2-42) halts production of medium trucks. Telegram amendment (3-20-42) modifies amendment Nos. 3 and 4. Amendment No. 5 (4-2-42) defines "off-the-highway motor vehicles." Amendment No. 6 (4-2-42) permits manufacturer to build trucks from materials for quotas authorized before March, 1942, for certain purposes. Amendment No. 7 (4-25-42) rescinds prohibition against putting tires and tubes on heavy trucks except for delivery to dealers.
L-1-c	Prohibits sales of medium and heavy trucks except for defense use (1-8-42). *Expires Jan. 15, 1942.* Amendment No. 1 (1-8-42) modifies sales ban. Amendment No. 2 (1-14-42) extends ban to Feb. 2, 1942. Amendment No. 3 (1-20-42) permits transfers and repossessions. Amended (2-25-42) covering fire apparatus.
L-1-d	Explains forms to be used by persons handling motor carriers (2-14-42).
L-1-e	Halts medium and heavy truck output for civilian use after completion of quotas (4-11-42).
L-1-f	Grants producers until April 30 to complete February quotas; until May 31, to complete March quotas (4-2-42).
L-2	Restricts production of passenger automobiles (9-13-41). Interpretation No. 1 (12-23-41) exempts units made for specified defense agencies from quotas.
L-2-a	Supplement (10-24-41). December quotas. Amended (2-21-42) respecting March quotas.
L-2-b	Restricts use of bright work on automobiles after Dec. 15 (10-27-41). Amendment No. 1 (12-10-41) extends effective date of L-2-b to Dec. 31, 1941; exempts certain parts.
L-2-c	Supplement (11-7-41). January quotas.
L-2-d	Supplement (12-10-41). February quotas.
L-2-e	Revision of production schedules for December and January; limits number of tires per car (12-24-41). Amendment No. 1 (1-23-42) revised quotas.
L-2-f	Restricts sales of passenger automobiles (1-1-42). *Expired Jan. 15, 1942.* Amendment No. 1 (1-8-42) permits certain sales. Amendment No. 2 (1-14-42) changes expiration date of ban. Amendment No. 3 (1-20-42) permits certain transfers and repossessions. Order extended (4-2-42) for 30 days to complete February and March quotas of civilian trucks.
L-2-g	Prohibits manufacture of passenger cars (1-21-42). *Expires when revoked.*
L-2-h	Permits completion of specified ambulance chassis (1-31-42).
L-2-i	Permits sale of auto plant steel inventories under specified conditions (3-9-42).
L-3-e	Prohibits sale of light motor trucks until Jan. 15, 1942 (1-1-42). Amendment No. 2 (1-14-42) extends expiration date to 2-2-42.
L-3-f	Prohibits production of light trucks (2-1-42).
L-4	Restricts production of replacement parts used in repair of passenger automobiles and light trucks (9-19-41). Interpretation No. 1 (12-23-41) exempts from quotas units made for specified defense agencies. Amendment No. 1 (11-22-41) establishes optional base period. Amendment No. 2 (1-23-42) defines replacement parts.
L-4-a	January, 1942, production schedule for light trucks for civilian use (11-14-41). Amendment No. 1 (1-23-42) increases output 150 per cent.
L-4-b	Restricts use of scarce materials in manufacture of storage batteries for passenger cars and light trucks until Sept 30 (4-25-42).
L-4-c	Restricts production of auto replacement parts (5-8-42). Amendment No. 1 (5-8-42) postpones effective date of L-4-c until May 15.
L-5	Restricts domestic mechanical refrigerator production (9-30-41). Related form, PD-125. Interpretation No. 1 (4-20-42) exempts production built to official specifications for use on vessels. Amendment No. 2 (4-25-42) exempts low temperature refrigerators for quick freezing or storage of frozen foods from order.
L-5-a	Excludes from quotas refrigerators made for specified war uses. January, February quotas (1-6-42). Amendment (1-6-42) permits certain sales. *Superseded by L-5-c.*
L-5-b	Restricts sale of refrigerators (2-14-42). Interpretation No. 1 (2-16-42) clarifies deadline on sales. Amendment (3-2-42) permits sales, without WPB permission, to government agencies. Amendment No. 2 (3-26-42) permits dealers to dispose of stocks. Amendment No. 3 (4-20-42) permits disposal of dealers' stocks and transfer of units between warehouses.
L-5-c	Prohibits refrigerator production after 4-30-42. *Supersedes L-5-a.* Amendment No. 2 (3-27-42) permits acquisition of materials by government agencies. Amendment No. 3 (3-28-42) prohibits manufacture of all domestic mechanical

Order Number	Subject
	refrigerators after May 1, 1942, except certain numbers of kerosene refrigerators. *Expires when revoked.*
L-5-d	Releases frozen refrigerator stocks to certain consuming categories after 6-15-42. Related forms: PD-427, PD-428, PD-429, PD-430, PD-431, PD-432.
L-6	Restricts production of laundry equipment (10-29-41). *Expires when revoked.*
L-6-a	Extends original curtailment period on laundry equipment to Jan. 31, 1942; sets further restrictions on February, 1942, production (12-12-41).
L-6-b	Extends February laundry equipment quotas into March (2-24-42).
L-6-c	Stops laundry equipment production April 15 and May 15 (3-14-42). *Expires when revoked.*
L-7	Restricts production of non-mechanical ice refrigerators (10-29-41). Related forms, PD-176, PD-177.
L-7-a	Excludes from quotas refrigerators made for specified war uses; increases rate of curtailment (1-6-42). Amendment No. 1 (3-6-42) restricts production of ice refrigerators through March 31.
L-7-b	Restricts iron and steel use in ice refrigerators from April 1 to June 30, 1942 (3-30-42).
L-8	Restricts distribution of motor fuel in Atlantic Coast area. *Revoked Oct. 24.*
L-11	Restricts use of chlorine in pulp, paper and paperboard making (11-15-41). Amendment No. 1 (4-20-42) adjusts basis of limitation to amount used per ton of rag stock treated.
L-13	Restricts production of metal office furniture and equipment (11-7-41). Related forms, PD-134 and PD-136. Amendment No. 1 (12-31-41) establishes additional restrictions.
L-13-a	Prohibits manufacture of all types of metal office furniture and equipment (4-1-42). Amendment No. 1 (4-20-42) exempts metal shelving and lockers for government agencies delivered before July 15, 1942.
L-15	Restricts use of waste paper in eastern mills (10-25-41). *Revoked Jan. 5, 1942.*
L-18	Restricts output of domestic vacuum cleaners (1-1-42). Related form: PD-170. *Expires when revoked.*
L-18-a	Supplement (1-1-42). Establishes quotas for 1st quarter, 1942.
L-18-b	Halts production of vacuum cleaners after April 30 (3-30-42).
L-20	Restricts use of cellophane and similar materials derived from cellulose (11-8-41). Amendment No. 1 (1-10-42) enlarges list of restrictions. Amendment No. 3 (3-17-42) eliminates certain exceptions to order and extends order until revoked.
L-21	Restricts production of automatic phonographs, weighing, amusement and gaming machines (12-10-41). Related form, PD-182.
L-21-a	Orders cessation of all automatic phonograph, weighing and amusement machines on May 1 (3-16-42). *Expires when revoked.* Interpretation No. 1 (4-13-42) clarifies use of copper; sale of parts; filing of inventory form. Amendment No 1 (5-2-42) permits frozen stocks of materials to be disposed of to buyers with A-2 ratings or better.
L-22	Reduces amount of iron and steel used in warm air furnaces (4-11-42). *Expires when revoked.*
L-23	Restricts production of domestic cooking appliances (12-13-41). Related forms, PD-192-a and PD-203. Amendment No. 1 (2-7-42) prohibits use of bright work.
L-23-a	Extends L-23 until May 15 and permits restricted use of iron and steel for certain purposes (4-25-42).
L-23-b	Freezes stocks of domestic electric ranges. Related form: PD-417 (5-2-42).
L-23-c	Restricts production of domestic cooking appliances after July 31. Designates 39 labor shortage areas (5-14-42).
L-25	Restricts use of tin and lead foil after Mar. 15, 1942 (11-24-41). *Revoked 1-15-42.*
L-26	Restricts production of farm equipment (12-28-41). See P-95. *Expires Oct. 31, 1942.* Amendment No. 1 (3-30-42) modifies certain definitions and adds to restricted list. *Expires Oct. 31, 1942.* Amendment No. 2 (4-13-42) prohibits sale and export of equipment and parts in excess of quotas. Amendment No. 3 (5-8-42) permits specified increase in shipments to foreign countries. Related forms: PD-387, PD-308. Interpretation permitting wooden grain bin manufacture using only nails and hardware.
L-26-a	Prohibits manufacture after May 1 of farm tractors requiring rubber tires (3-9-42). Amendment No. 1 (4-20-42) stops production of farm equipment requiring rubber tires after April 30: of such combines after July 31.
L-26-b	Controls disposition of surplus iron and steel inventories (5-15-42). Related forms: PD-478, PD-479.
L-27	Restricts production of vending machines (12-31-41).
L-27-a	Stops production of certain types of vending machines April 30 (3-17-42).
L-28	Restricts use of scarce metal in incandescent lamps (1-24-42). *Expires when revoked.*
L-29	Restricts use of iron and steel in metal signs (3-25-42). *Expires when revoked.*
L-30	Restricts production of metal household articles (3-31-42). Amendment No. 1 (4-11-42) brings curtain rods, drapery attachments, etc., under control of order from L-62. Amendment No. 2 (5-9-42) excludes coat hangers using only a steel wire hook from order.
L-31	Restricts use of natural gas (2-16-42). Related form, PD-283. Amendment to Exhibit A, No. 2, extends restrictions to 6 midwestern states (4-23-42).
L-32	Restricts use of metal in auto license plates (3-18-42).
L-35	Restricts output of replacement parts for trucks, busses (1-22-42). *See P-107.* Amendment No. 1 (3-5-42) sets up 1942 production program.

Order Number	Subject
L-37	Restricts production of musical instruments (2-17-42).
L-38	Bans new air conditioning and commercial refrigerating installations and restricts manufacture and sale on rated orders (5-15-42).
L-39	Restricts use of scarce material in fire protective equipment (2-24-42). Amendment No. 1 freezes 2½-in. brass fire hose couplings in manufacturers' hands. Amendment No. 2 (5-2-42) freezes 2½-in. brass fire hose couplings in hands of distributors. Amendment No. 3 (5-21-42) permits manufacture of carbon dioxide extinguishers to certain specifications and brass hose couplings for Maritime Commission.
L-41	Prohibits start of unauthorized construction and places privately and publicly financed construction under control (4-9-42). Related forms: PD-200, PD-200-a. *Expires when revoked.* Amendment to schedule A (5-16-42) and designates where PD-200 and PD-200-a may be filed.
L-41-a	Stops amusement construction costing more than $5000 (5-23-42).
L-41-600	Permits government road building without individual project authorization (5-8-42). Related form: PR-46.
L-42	Establishes Simplification Schedule No. 1, specifications for iron, brass and bronze valves (2-11-42). Amendment No. 1 (5-16-42) removes restrictions on plumbing fitting and valve manufacture for Navy and Maritime Commission vessels. Simplification Schedule No. 2 (2-25-42)—cast, malleable iron, brass and bronze pipe fittings. Amendment No. 1 (4-4-42) exempts fittings for shipbuilding. Amendment No. 2 (5-16-42) removes restrictions on plumbing and valve manufacture for Navy and Maritime Commission vessels. Simplification Schedule No. 3 (3-7-42)—low pressure heating boilers. Simplification Schedule No. 4 (3-16-42)—cast iron soil pipe and fittings. *Expires June 1, 1942.* Amendment (4-13-42) limits production to a single weight. Simplification schedule No. 5 (3-23-42)—metals use in fittings and trim. Amendment No. 1 (5-6-42) permits use of lead and zinc as a preserving finish on fixtures and trim. Simplification schedule No. 5-a (4-9-42)—use of copper prohibited for certain items. Simplification schedule No. 6 (3-30-42)—cast iron tubular radiators. Simplification schedule No. 7 (3-30-42)—hot water heaters and piping systems. Amendment No. 1 (5-6-42) permits WPB to make exceptions to schedule VII in meritorious cases. Simplified schedule No. 8 (4-25-42)—simplification of vapor and vacuum heating specialties after June 15. Simplified schedule No. 9 (4-25-42)—limits manufacture of hot water storage tanks to three sizes after May 15. Amended restricting metal used in certain fixtures and limiting amount used for other purposes (5-28-42).
L-43	Restricts use of scarce material in motorized fire apparatus (2-27-42). Amendment No. 1 (4-14-42) prohibits use of rubber tires on auxiliary equipment.
L-44	Restricts output of radio and radio-phonographs (1-23-42). *Expires when revoked.*
L-44-a	Stops production of radio and radio-phonographs for civilian use on April 22 (3-7-42). *Expires when revoked.*
L-46	Establishes procedure for curtailing, when necessary, electric power use in Western New York (2-27-42). Amendment No. 1 (3-30-42) changes base period for limiting increases in deliveries.
L-48	Restricts production and sale of aircraft of less than 500 hp.; also limits aluminum use in such craft (2-17-42).
L-49	Restricts iron and steel use for beds, bed springs and mattresses (3-20-42). Related forms: PD-356 and PD-357. *Expires when revoked.*
L-50	Restricts certain practices of telephone companies (3-2-42). Amended (4-23-42) placing control on new installations. *Expires when revoked.*
L-51	Restricts production of anti-freeze (5-14-42).
L-52	Restricts production of bicycles and bicycle parts (3-12-42). *Expires when revoked.*
L-52-a	Freezes sale of new adult bicycles (4-2-42). Amendment No. 1 (4-7-42) includes all bicycles having frames over 17 in. Amendment No. 2 (5-13-42) permits restricted sale of adult bicycles.
L-53	Directs sale of track-laying tractors and auxiliary equipment (2-19-42). Related form: PD-323. *Expires when revoked.*
L-53-a	Curtails manufacture after Sept. 1 of track-laying tractors used in agricultural operations (4-9-42). *Expires when revoked.*
L-54	Freezes deliveries of new and used typewriters (3-6-42). *Revoked by L-54-b.* Amendment No. 1 (3-7-42) covers used machines under repair.
L-54-a	Restricts production of typewriters (3-17-42). *Expires when revoked.* Interpretation No. 1 (4-3-42) permits manufacture of sub-assemblies and parts in economic manufacturing lots in excess of quotas. Interpretation No. 2 (4-11-42) clarifies status of government agency controlled, privately operated plants or shipyards. Amendment No. 1 (3-24-42) includes under order wide carriage and shorthand writing machines.
L-54-b	Limits sale and rentals of specified types of new office machinery except on ratings of A-9 or higher (3-17-42). Related forms: PD-1-a, PD-3, PD-3-a. *Expires when revoked. Revokes L-54.* Amendment No. 2 (5-8-42) permits return of new office machinery to manufacturers from dealers.

Order Number	Subject
L-55	Restricts sales of shotguns; sets up production quotas (2-23-42). *Expires when revoked.*
L-56	Restricts delivery of fuel oil in East and Northwest (3-14-42). *Expires when revoked.* Amended (5-13-42) to restrict deliveries of fuel for certain commercial purposes. *Expires when revoked.*
L-57	Restricts sales and manufacture of gas masks and anti-gas devices (3-3-42). Related form: PD-328. *Expires when revoked.*
L-59	Restricts manufacture of metal plastering bases, lath, etc. (3-25-42). Amendment No. 1 (5-16-42) prohibits production for war contracts in addition to quotas. Amendment No. 2 (5-18-42) modifies distribution restrictions.
L-60	Freezes sale or other disposition of new pistols, rifles and shotguns (2-27-42). *Expires June 1, 1942.* Amendment No. 1 (5-26-42) permits retail sale of specified firearms.
L-61	Restricts production and distribution of tire recapping and retreading equipment (3-11-42). Related form: PD-1-a. *Expires when revoked.*
L-62	Curtails production of metal household furniture; all production to halt May 31 (3-20-42). *Expires when revoked.* Amendment No. 1 (4-11-42) transfers control of drapery attachments from L-62 to L-30. Amendment No. 2 (5-14-42) permits use of iron and steel stocks partly processed.
L-63	Limits inventories of 19 kinds of supplies (4-6-42). Related forms: PD-336, PD-1-x. *Revokes M-67. Expires when revoked.* Amended (4-17-42) to exempt warehouses as defined in order M-21-b. Correction (4-14-42) to include railroad supplies on form PD-336 in order L-63. Exemption No. 1 (4-17-42) permits warehouses carrying products on Lists "A" and "B" of order M-21-b to omit these products in reports required by L-63. Amendment No. 1 (4-27-42) removes health supplies from products subject to control. Amendment No. 2 (5-5-42) permits wholesalers to accept specific items regardless of inventory. Exemption No. 3 (5-12-42) removes tires, tubes and automotive parts from order. Exemption No. 4 (5-4-42) removes from restrictions of order wholesalers stocks of supplies made of aluminum. Interpretation No. 1 (5-15-42) exempts 11 items from control of order. Amendment No. 3 (5-23-42) makes optional the basing of sales on preceding quarter or second preceding month for certain dealers.
L-64	Restricts use of iron and steel in burial vaults and caskets (3-28-42).
L-65	Halts use of critical materials in manufacture of electrical appliances after May 31 (3-30-42). Related form: PD-370. *Expires when revoked.* Amendment No. 1 (4-9-42) adds restrictions in regard to material used and production.
L-67	To reduce and finally prohibit after June 30 production of lawn mowers (3-30-42). *Expires when revoked.* Amendment No. 1 (5-22-42) permits limited production until June 30.
L-68	Restricts sale of metal closures: zippers, buttons, rivets, etc. (3-28-42). *Expires when revoked.*
L-69	Extends ban on use of bright work on all types of motor vehicles and trailers (3-14-42).
L-70	Restricts delivery of gasoline in East and Northwest (3-14-42). Related forms: PD-368, PD-379. *Expires when revoked.* Amendment No. 1 (4-8-42) cuts gas deliveries to bulk consumers and service stations where curtailment is in effect. Related form: PD-368. *Effective April 16, 1942.* Amendment No. 2 (5-13-42) reduces gasoline deliveries in certain areas. Related form: PD-367.
L-71	Restricts use of scarce materials in production of flashlights (3-27-42). *Expires when revoked.*
L-72	Restricts razor and razor blade production. *Expires when revoked.*
L-72-a	Freezes sale and delivery of safety razors in hands of manufacturers and jobbers.
L-73	Restricts use of iron and steel in metal office supplies (3-28-42). *Expires when revoked.*
L-74	Prohibits manufacture of domestic oil burners after May 31 and limits production for industrial and commercial use (4-15-42). *Expires when revoked.*
L-75	Prohibits manufacture of coal stokers except industrial and commercial types after May 31 (4-15-42). *Expires when revoked.*
L-76	Prohibits manufacture of vacuum tubes for specified civilian radios (4-17-42). *Expires when revoked.*
L-77	Restricts manufacture of metal windows (3-25-42). *Expires when revoked.* Amendment No. 1 (4-26-42) permits manufacture for rated housing projects.
L-78	Prohibits manufacture of fluorescent lighting fixtures except under certain conditions (4-2-42). *Expires June 30, 1942.* Amendment No. 1 (4-23-42) sets closing date on manufacture and eases restrictions on small fixtures. Survey of producers and distributors parts stocks to be filed on PD-499.
L-79	Freezes all stocks of plumbing and heating equipment except retail sales of $5.00 or less and rated orders (4-16-42). *Expires when revoked.* Interpretation (4-21-42) subjects gas cooking stoves to terms of order. Interpretation (5-22-42) permits transfer of title when stocks are used for security collateral. Amended to ease restrictions imposed by original order (5-23-42).
L-80	Restricts production and sale of outboard motors and parts; freezes stocks (4-27-42). *Expires when revoked.* Amendment No. 1 (5-2-42) permits manufacturers' sale or lease of motors of 6 hp. or more to government agencies.

Order Number	Subject
L-81	Restricts production of metal and plastic, other types toys and games (3-30-42). Amendment No. 1 (4-6-42) permits use enamel and other coatings on toys and games until June 30. Interpretation No. 1 (5-8-42) clarifies meaning of term "raw material" in order.
L-82	Restricts production and sale of power cranes, shovels, and rubber-tired construction equipment (5-2-42). Related forms: PD-445, PD-446 and PD-448.
L-82-a	Assumes rigid control over production and distribution of all types of rubber tired construction equipment. Related forms: PD-446 and PD-448. (5-4-42)
L-83	Controls production and sale of industrial machinery: controls used or rebuilt machinery (4-4-42). Related forms: PD-1, PD-1-a, PD-3, PD-3-a, PD-200, PD-200-a. *Expires when revoked.* Amendment No. 1 (4-20-42) removes restrictions until May 15. Amended (5-18-42) to add dairy, coffee grinding and food slicing and grinding machinery to order. *Expires when revoked.*
L-84	Prohibits use of chromium and restricts use of other materials in electric heating pads (4-4-42). *Expires when revoked.* Amendment No. 1 (4-15-42) prohibits electric heating pad production after June 30, 1942.
L-86	Curtails sale and installation of liquified petroleum gas equipment (4-8-42). Related form: PD-397. *Expires when revoked. Use of P-98 and P-46 forbidden.* Interpretation No. 1 (4-27-42) clarifies exemption paragraph in order. *Expires Oct. 31, 1942.*
L-88	Prohibits sale of used rail or relayer, re-roll, or scrap grade (4-22-42). *Expires when revoked.* Amendment No. 1 (5-18-42) relaxes control over shipments up to 10 tons of relay rail and removes high T rail from terms of order.
L-91	Bans production of commercial laundry equipment after June 1, and dry cleaning equipment after July 1 (4-18-42). Related forms: PD-25-a, PD-25-x, PD-418, PD-419. *Expires when revoked.*
L-92	Prohibits use of scarce materials in fishing tackle; restricts hook output (4-23-42). *Expires when revoked.*
L-94	Requires integrating of power systems and establishes machinery for mandatory curtailment of commercial, industrial, and residential power. Related form: PD-424. (5-1-42)
L-97	Schedules production and sale of locomotives (4-4-42). *Expires when revoked.* Amendment No. 1 (4-29-42) excludes mining locomotives from order.
L-97-a	Schedules production and sale of railroad cars (4-4-42). *Expires when revoked.*
L-97-a-1	Cancels ratings for freight car construction under certain conditions and permits interchange of materials by producers (4-30-42). Amendment No. 1 (5-14-42) permits producers to accept parts and materials not subject to other rated orders from suppliers.
L-98	Restricts production of domestic sewing machines and parts until June 15, when production must cease (4-25-42).
L-100	Places heavy compressors under complete allocation. Related forms: PD-415, PD-416, PD-420. *Expires when revoked.*
L-102	Freezes sale, lease, or option of used electric generating equipment and steam boilers (4-11-42).
L-104	Restricts metal used and regulates length and thickness of hairpins and bob-pins (4-25-42).
L-105	Prohibits manufacture and sale of protective helmets except to government agencies or to United Nations (4-29-42).
L-106	Prohibits use of copper and copper base alloys in manufacture of specified automobile parts (5-6-42).
L-108	Limits finishes on metal working machinery and restricts final finish to "old-machine-tool gray" (4-27-42). Prohibits use of copper and alloys in all but motor vehicle operating parts (5-6-42).
L-110	Controls production and sale of electroplating and anodizing equipment (5-11-42). *Expires when revoked.* Related form: PD-1-a.
L-111	Eliminates all but most essential uses of rubber tires on hand trucks. Related form: PD-468 (5-7-42). *Expires when revoked.*
L-113	Prohibits use of any metal except limited quantities of iron or steel in pencil manufacture; restricts finishing materials (5-2-42). Amendment No. 1 (5-15-42) prohibits use of certain finishing materials.
L-114	Regulates use of aluminum, copper, plastics, and other materials in manufacture of safety equipment. (5-5-42)
L-115	Prohibits manufacture of incendiary bombs for demonstration purposes to conserve aluminum and magnesium. Related form: PD-449. (5-7-42)
L-117	Restricts manufacture and sale of heavy power and steam equipment (5-18-42). Amendment No. 1 (5-25-42) exempts equipment solely for marine use.
L-123	Controls distribution of 14 classes of general industrial equipment (5-26-42).
L-134	Controls instrument production and sales to conserve nickel and chromium (5-26-42).

Forms to Use With Priority Orders

Forms below are those in use at time of going to press. See column "Related Forms," pages 6 to 18

Form No.	Description
PD-1	Obsolete after Feb. 2, 1942. *See PD-1-a.*
PD-1-a	Application for preference rating in cases where PD-3-a is not applicable. Effective after Feb. 2, 1942. *May be reproduced.*
PD-1-c	Application for rating to be used only by ship repair yards for inventory needed for ship repairs.
PD-1c-a	Affidavit to accompany application for rating for inventory needed for repairs which are to be used by ship yards, facilities, chandlers and ships in service.
PD-1-x	Application for rating to be used by distributers, jobbers and wholesalers; re. L-63.
PD-2	Civilian Preference Rating.
PD-3	Obsolete after Feb. 2, 1942. *See PD-3-a.*
PD-3-a	Application for preference rating for orders from Army, Navy, Coast Guard, Maritime Commission, Coast and Geodetic Survey, Panama Canal, National Advisory Committee on Aeronautics, Civil Aeronautics Authority, Office of Scientific Research and Development, Surplus Marketing Administration, and contracts or orders from foreign governments. Replaces, after Feb. 2, 1942, former PD-3, PD-4 and PD-5. *May NOT be reproduced.*
PD-4	Obsolete after Feb. 2, 1942. *See PD-3-a.*
PD-5	Obsolete after Feb. 2, 1942. *See PD-3-a.*
PD-6	Manufacturers' monthly report of extension of preference rated orders.
PD-6 Rev.	Crane builders and cutting tool producers report.
PD-6-a	Alternate of PD-6.
PD-7 Rev.	Producers' monthly report of synthetic rubber and plasticized resin requirements.
PD-8	Aluminum priority rating index sent to aluminum suppliers as guide to scheduling deliveries.
PD-9 Rev.	Users' monthly application for allocation of tungsten powder, ferrotungsten or tungsten compounds; re. M-29.
PD-9-a	Report of consumption of tungsten for metallic uses and request for allocation for a given month; re. M-29.
PD-9-b	Report of tungsten consumption for non-metallic uses and request for allocation for a given month; re. M-29.
PD-9-c	Application for allocation of tungsten for metallic and non-metallic uses for delivery in a given month; re. M-29.
PD-10	Request for nickel bearing steel, re. M-5. *Obsolete.*
PD-11	Report of inventory of nickel bearing steel; re. M-5.
PD-12	Report of copper and copper alloy products; re. M-9.
PD-13	Producers or rated subcontractors monthly report of preference rated orders placed during a month; re. P-3.
PD-14	Producers or subcontractors monthly report of preference rated orders placed during a month; re. P-4.
PD-17	*Obsolete.*
PD-18	Manufacturers' monthly report of receipts and shipments of nickel bearing steel.
PD-19-a, PD-19-b	*Obsolete.*
PD-20	Application for preference rating for zinc; re. M-11.
PD-21, PD-22, PD-23	*Obsolete.*
PD-23-b	Monthly copper deliveries by producer.
PD-24	Priorities Critical List.
PD-25-a	First report of requirements of scarce materials; re. Production Requirements Plan.
PD-25-a Rev.	Standard form of subsequent report of requirements of scarce materials. Revised for 3rd quarter reports; re. P-90.
PD-25-b	*Obsolete.*
PD-25-c, PD-25-d	*Obsolete.*
PD-25-c-1	Civilian aircraft repair report; re. P-6-a.
PD-25-c-2	Civilian aircraft repair report; re. P-6-a.
PD-25-e	Certificate of analysis of defense supplies business.
PD-25-f Rev.	Appeal; re. PRP-order P-90, for higher rating or additional materials than granted on PD-25-a.
PD-25-g	Report of ratings other than assigned on PD-25-a; re. P-90.
PD-25-x	Application under Modified Production Requirements Plan; re. P-90. *Obsolete after May 23.*
PD-26	Report of proposed aluminum shipments filed monthly with WPB by fabricators, secondary smelters and producers.
PD-26-a Rev.	Producer's, secondary smelter's application for authorization to ship aluminum or aluminum products.
PD-26-m	Producers' application for authority to ship magnesium.
PD-27	Monthly application for allocation of nickel for melting purposes; re. M-6.
PD-28	Cork supplier's affidavit of compliance with special direction of WPB; re. M-8.
PD-29	Supplier's monthly report of cork inventories, deliveries, production and requirements; re. M-8.

Form No.	Description
PD-30	Producer's or rated subcontractor's monthly report on use of priority ratings for shipbuilding material.
PD-30-a	Alternate to PD-30.
PD-31	Primary nickel report; re. M-6-a.
PD-33	Synthetic rubber producer's monthly report of stocks, production and orders; re. M-13.
PD-34	Steel producer's report concerning failure to meet customer's delivery requirements.
PD-35	Steel producer's report concerning refusal to accept customer's order.
PD-36 Rev.	Fabricator's monthly report on stocks, use and requirements of synthetic rubber and plasticized resin; re. M-13, M-10.
PD-37	Monthly report of production of duty-free refined copper.
PD-38	Producer's or subcontractor's monthly report of extension of preference rated orders for freight car material; re. P-8.
PD-38-a	Alternate to PD-38.
PD-39	Aluminum producer's monthly report of shipments (an informal questionnaire).
PD-40	*Obsolete.*
PD-40-a Rev.	Aluminum buyer's quarterly report of inventories and consumption.
PD-40-m	Producers' application for authority to ship aluminum.
PD-41	Monthly report of extension of preference rated orders for material for ship conversion; re. P-10.
PD-41-a	Alternate to PD-41.
PD-42	Producer's or subcontractor's monthly report of orders for metal working equipment; re. P-11.
PD-42-a	Alternate to PD-42.
PD-43	Producer's or subcontractor's monthly report of extension of preference ratings for material for bombers.
PD-43-a	Alternate of PD-43.
PD-44	Producer's or subcontractor's monthly report of extensions of preference ratings for material for bombers.
PD-44-a	Alternate to PD-44.
PD-45	Producer's or subcontractor's monthly report of extensions of preference ratings for material for bombers.
PD-45-a	Alternate to PD-45.
PD-46	Producer's or subcontractor's monthly report of extensions of preference ratings for material for bombers.
PD-46-a	Alternate to PD-46.
PD-47	Producer's or subcontractor's monthly report of extensions of preferences ratings for material for bombers.
PR-47-a	Alternate to PD-47.
PD-48	Producer's or subcontractor's monthly report of extensions of preference ratings for materials for bombers.
PD-48-a	Alternate to PD-48.
PD-49 Rev.	Processor's monthly report of stocks, consumption and receipts of crude rubber; re. M-15.
PD-49-a	Importer's and dealer's monthly report on crude rubber; re. M-15.
PD-50	Customer's sworn statement to accompany each order for zinc; re. M-11.
PD-50-a	Producer's monthly statement of compliance with zinc order M-11.
PD-51	Monthly cork allocation; re. M-8.
PD-52	Producer's or subcontractor's monthly report of extensions of preference ratings for materials for Curtiss-Wright airframes.
PD-52-a	Alternate to PD-52.
PD-53-a Rev.	Monthly application for chromium for melting; re. M-18.
PD-53-b Rev.	User's monthly report of chromium stocks and consumption; re. M-18.
PD-54 Rev.	User's monthly request for chromium chemicals; re. M-18, M-18-b. *See also M-21-d.*
PD-55	User's request for refractories containing chromium (one copy to producer, two to WPB).
PD-56	Producer's or subcontractor's monthly report of extension of preference ratings for materials for shipway construction; re. P-14-a and P-14-b.
PD-56-a	Alternate to PD-56.
PD-57	Producer's or subcontractor's monthly report of extensions of preference ratings for materials for electrical relays and solenoids; re. P-15.
PD-57-a	Alternate to PD-57.
PD-58	Producer's or subcontractor's monthly report of extension of preference ratings for materials for radio equipment; re. P-16.
PD-58-a	Certification covering PD-58.
PD-59 Rev.	Monthly copper inventory report; re. M-9-a.
PD-59-a Rev.	Supplementary report of sales or purchases of copper in intermediate form for further processing, as requested by PD-59.
PD-59 Supplementary A.	Supplementary statement on consumption of copper for further rolling or processing; re. M-9-c.
PD-59-c	Report of deliveries of copper; re. M-9-c.
PD-60	*Obsolete.*
PD-60-a	*Obsolete.*
PD-60-b Rev.	Fabricator's monthly report of inventory of copper for domestic consumption; re. M-9-a.
PD-61	Refiner's monthly report of production and shipments of duty-free refined copper; re. M-9-a.
PD-62	Consumer's monthly application for allocation of zinc oxide; re. M-11.
PD-63	*Obsolete.*
PD-63-a	*Obsolete.*
PD-64	Producer's or supplier's monthly report of extension of preference ratings for material for locomotives; re. P-20.

Form No.	Description
PD-64-a	Certification to accompany purchase orders by supplier or producer; re. P-20.
PD-65	Supplier's or repairshop's monthly report of extension of preference ratings for materials for locomotive repair; re. P-21.
PD-65-a	Certification to accompany purchase orders by repair shop or supplier; re. P-21.
PD-66	Report of lead user showing stocks, unfilled orders, consumption and estimated requirements; re. M-38.
PD-66-a	Consumer's monthly application for allocation of lead; re. M-38.
PD-67	*Obsolete.*
PD-68	Builder's or supplier's monthly report of extension of preference ratings for material for construction of defense projects; re. P-19-a.
PD-68-a	Certification to PD-68.
PD-69 Rev.	Consumer's allocation request for pig iron (to be sent to producer); re. M-17.
PD-70	Consumer's monthly report of inventory and consumption of pig iron (file with WPB); re. M-17.
PD-71	Pig iron producer's proposed monthly shipping schedule; re. M-17.
PD-71-a	Order setting pig iron reserve pool (sent to producer by WPB); re. M-17.
PD-71-b	WPB monthly authorization to pig iron producer to make shipments; re. M-17.
PD-71-c	WPB authorization (allocation) to pig iron producer to ship to an individual user; re. M-17.
PD-71-d	Producers monthly pig iron tabulation; re. M-17.
PD-72 Rev.	Consumer's monthly report of requirements of calcium-silicon; re. M-20.
PD-73	Steel consumers' requirements. *Revoked June 1, 1942.*
PD-74	Monthly report of extension of preference ratings for material for experimental research work; re. P-24.
PD-74-a	Alternate to PD-74.
PD-75	Consumer's monthly request for alloy iron or steel.
PD-76	Copper refiner's monthly allocation report to WPB; re. M-9.
PD-79	Producers' report of requirements for health supplies, to accompany each request for rating under P-29.
PD-81	Monthly report of extension of preference ratings for material covered by various orders; to be made by person using the rating; re. P-95.
PD-81-a	Alternate to PD-81.
PD-82	Standard form of application for preference rating for deliveries of scarce material for war projects.
PD-82-a	Application for priority rating by oil industry supply houses; re. P-83.
PD-83 Rev.	Monthly steel warehouse report; re. M-21-b.
PD-83-a	Monthly steel warehouse delivery report; re. M-21-b.
PD-83-b	Individual preference rating certificate for steel warehouse requirements; re. M-21-b.
PD-83-c	*Obsolete.*
PD-83-d	Classification instructions for steel warehouse monthly report on PD-83.
PD-83-e	Steel warehouse's request for change in "producers" supplying products with A-9 rating; re. M-21-b.
PD-83-f	Steel producer's report to warehouses; re. M-21-b.
PD-83-g	Steel warehouse's request for priority extension; re. M-21-b.
PD-84	Vanadium report. *Superseded by PD-209-a and PD-209-b.*
PD-88	Standard form of application for preference rating.
PD-90	Report form for nickel in electric wire.
PD-92	*Cancelled.*
PD-93	*Abolished March 30 by amendment to P-62.*
PD-93-a	Abolished by amendment to P-62.
PD-94 Rev.	Monthly application for allocation of zinc; re. M-11.
PD-94-a	Consumer form under zinc allocation; re. M-11.
PD-95	*Cancelled.*
PD-96	Buyer's application for preference rating for scarce materials for maintenance and repair of aircraft and equipment; re. P-47.

Forms Which Do Not Have to Be Filed

• • • **Priorities Regulation No. 8,** issued March 16, 1942, eliminated a number of forms which in the past have had to be filed in connection with various priority orders. Table A below lists forms which do not have to be filed in the future, except to the extent required by the orders listed in table B.

Table A—PD Forms

6	41	45	52	63	74
6A	41A	45A	52A	63A	74A
13	42	46	56	64	81
14	42A	46A	56A	65	81A
30	43	47	57	68	93
30A	43A	47A	57A	68A	
38	44	48	58		
	44A	48A	58A		

Table B—P Orders

(Reports Must Be Filed with These Orders)

29	51	73	87
42	56-a	82	95
42-a	62	86	115
43	65		
	68		

Form No.	Description
PD-97	Monthly report of radio parts maker concerning inventory and use of aluminum foil.
PD-99	Steel producer's monthly report of allocations, capacities and production schedule; M-21.
PD-99-b	Steel forging schedule; re. M-21.
PD-100	Monthly report of steel producer (with more than one plant) on capacity, production and allocations; re. M-21.
PD-101	Producer's quarterly report of high speed steel orders and shipment; re. M-14.
PD-105 Rev.	Builder's application for preference rating for privately owned defense housing; re. P-55.
PD-105-b	*Superseded by PD-105 as revised 12-15-41.*
PD-107	Questionnaire to be filed by applicants for preference rating for material for research laboratories; re. P-43.
PD-108	Questionnnaire to be filed by producer concerning material for aircraft accessories.
PD-109	Foundryman's report of receipts, purchases and consumption of copper scrap for period Oct. 1 to Nov. 1, 1941; re. P-61.
PD-114	Application for authorization to enter into toll processing agreement covering aluminum.
PD-115	Metal working equipment production report; re. P-11-a.
PD-117	Mining machinery report; re. P-23.
PD-119	Mine operator's monthly report of use of priority ratings for material for mines; re. P-56.
PD-119-a	Monthly report on foreign mines; re. P-56.
PD-120	Monthly report of scrap dealer showing inventory of copper, lead, nickel, tin and zinc scrap.
PD-121	Monthly report of copper scrap consumer.
PD-121-a	Smelter's monthly copper scrap inventory report.
PD-121-b	Foundry's monthly report of copper scrap inventory.
PD-123-a Rev.	Producer's monthly report of requirements of copper and copper alloys; December; re. M-9-a. *Superseded by PD-123-a.*
PD-123-a	Producer's monthly report of requirements of copper and copper alloys for re. M-9-a.
PD-123-b Rev.	Monthly report of deliveries of copper and copper alloys; re. M-9-a.
PD-124	Lead producer's proposed monthly shipping schedule; re. M-38.
PD-125	Manufacturer's monthly report concerning domestic mechanical refrigerators; re. L-5.
PD-126	Dealer's application for A-10 preference rating for deliveries of copper scrap; re. P-61.
PD-127	Purchaser's certificate covering chlorinate hydrocarbons to accompany each order; re. M-41.
PD-128	Processor's report covering manila fibers and products; re. M-36.
PD-129	Importer's and dealers monthly statement covering manila fibers and products; re. M-36.
PD-129, part II.	Dealers report on manila fibers; re. M-36.
PD-130	Application for authorization to receive copper and copper alloy scrap; re. M-9-b. Form not to be used by refiners or dealers.
PD-131	*Cancelled.*
PD-132	*Obsolete.*
PD133	*Cancelled.*
PD-134	Monthly report covering metal office furniture and equipment inventories and production and metal inventories, receipts and consumption; re. L-13.
PD-134-b	Report of production and inventories and steel in finished items of metal office furniture and equipment; re. L-13.
PD-135	Application for priority rating to complete privately financed dwellings whose foundations were in place 8-9-41; re. P-71.
PD-136	Application for conversion of weights of metal other than steel to an equivalent weight of steel; re. L-13.
PD-138	Monthly steel producers report of shipments; re. M-21, amend. No. 2.
PD-139	Monthly steel producers unfilled contracts report; re. M-21, amend. No. 2.
PD-143	Fabricator's monthly report of chlorinated rubber requirements; re. M-46.
PD-144	Fabricator's monthly report of chlorinated rubber receipts, consumption, inventories and requirements; re. M-46.
PD-145	Application for specific allocation of titanium pigments; re. M-44.
PD-146	Manufacturer's certificate concerning titanium pigments; re. M-44.
PD-148	Application for preference rating for scarce materials for iron and steel plant operation; re. P-68.
PD-149 Rev	Monthly report of iron and steel scrap producer; re. M-24.
PD-150 Rev	Monthly report of iron and steel scrap consumer; re. M-24.
PD-151	Monthly report of iron and steel scrap broker or dealer; re. M-24.
PD-152	Monthly application for allocation of cobalt for metallic uses; re. M-39.
PD-153	Monthly application for allocation of cobalt chemicals for non-metallic uses; M-39.
PD-154-a	Order for reservation of sheet steel for container making; re. M-45.
PD-155-a	Authorization to process steel for containers, re. M-45.
PD-156	Application for sheet steel for drums; re. P-76.

Form No.	Description
PD-156-a..	Application for preference rating for steel sheets for drums; Alternate to PD-156.
PD-157....	Report of sales of rebuilt machine tools; re. P-77.
PD-158-b..	Chlorine sales report.
PD-158-c..	Chlorine consumption report.
PD-158-d..	Chemical manufacturer's report on chlorine.
PD-158-e..	Purchaser's report on chlorine.
PD-159-a..	Producer's monthly report of chlorine production; re. M-19.
PD-159-b..	Distributor's monthly report of distribution of chlorine sales; re. M-19.
PD-159-c..	Consumer's monthly report of chlorine use in his own plant; re. M-19.
PD-159-d..	Chlorine report certification.
PD-159-e..	Monthly report on chlorine consumption.
PD-159-f...	Producers monthly chlorine report.
PD-160....	Purchaser's monthly certificate of necessity for freon refrigerants; re. M-28.
PD-161....	Direct use order for freon refrigerants; re. M-28.
PD-162....	Factory receipts, consumption and stocks of freon refrigerants; re. M-28.
PD-163....	Monthly allocations of freon refrigerants; re. M-28.
PD-164....	Producer's monthly report of production, stocks and sales of freon refrigerants; re. M-28.
PD-165....	Request for name of supplier of material covered by PD-1-a.
PD-166....	Application for priority rating for material for blind-made products; re. P-82.
PD-167 Rev.	Copper user's request for relief under hardship clause of copper conservation order: re. M-9-c.
PD-169....	Producer's monthly steel plate rolling schedule; re. M-21.
PD-169-a..	Summary of producer's monthly steel plate schedule; re. M-21.
PD-170....	Manufacturer's monthly report on domestic vacuum cleaner production; re. L-18.
PD-171....	*Cancelled.*
PD-172....	Application for permission to use copper or copper alloy material in stocks affected by order M-9-c.
PD-173....	Monthly report of producers, approved smelters and fabricators of magnesium and magnesium products; re. M-2-b.
PD-174....	Report of magnesium powder received, shipped and inventories, and disposition of scrap; re. M-2-b.
PD-175....	Customer's statement to supplier of copper or copper base alloy products concerning end use of copper ordered.
PD-176....	*Obsolete.*
PD-177....	Manufacturer's monthly report of domestic ice refrigerator production; re. L-7.
PD-178-a..	Producer's application for allocation of phenol and ortho cresol.
PD-178-b..	Producer's application for allocation of meta para cresol and cresylic acid.
PD-179....	Application for preference rating for material for rebuilding machine tools; re. P-77.
PD-180....	Consumer's monthly application for allocation of phenols; re. M-27.
PD-182....	Manufacturer's monthly report of production of slot machines; re. L-21.
PD-183....	Application for preference rating for steel plates and electrodes for welders' training classes; re. P-92.
PD-184....	Obsolete.
PD-185....	Report of inventory and consumption of sperm oil; re. M-40.
PD-186....	Report of sales and inventories of burlap by importer, importing bag manufacturer and non-importing bag maker; re. M-47. (Initial report.)
PD-187....	Burlap importers' report; re. M-47.
PD-188....	Monthly report of sales and inventories of burlap by importers, importing bag makers and non-importing bag makers; re. M-47. (Subsequent reports.)
PD-188-a..	Report of unbroken burlap bales; re. M-47.
PD-189....	Report required on semi-finished products under paragraph (a) (4) (iv) of copper conservation order M-9-c.
PD-190....	Consumer's certificate to accompany all orders for chlorine; re. M-19.
PD-190-a..	Monthly application (by 15th) of pulp and paper makers for chlorine; re. M-19.
PD-191 Rev.	Producer's monthly report of proposed schedule of chlorine shipments; re. M-19.
PD-191-a..	Chlorine producer's delivery schedule; re. M-19.
PD-192....	Report of iron and steel use in cooking appliances; re. L-23.
PD-192-a..	Report of output and amount of iron and steel in cooking appliances; re. L-23.
PD-193-a..	Schedule of withdrawals and amount of stores or inventories (water systems); re. P-46.
PD-193-b..	Water system repair report; re. P-46.
PD-194-a..	Electric utility's report of withdrawals and inventories; re. P-46.
PD-194-b..	Electric utility report for maintenance and repair; re. P-46.
PD-194-c..	Electric utility repair report; re. P-46.
PD-195-a..	Natural and manufactured gas utility's report of withdrawals and inventories; re. P-46.
PD-195-b..	Gas utility report for maintenance and repair; re. P-46.
PD-195-c..	Gas utility repair report; re. P-46.
PD-196....	Cork end products report; re. M-8-a.
PD-197....	Report of shipments of lead and lead alloys.
PD-198....	Report on pulp shipments; re. M-52.
PD-200....	Application for rating for defense project; re. L-41.
PD-200-a..	Housing project material list; re. L-41.

Form No.	Description
PD-201	Allocation for steel; re. M-21.
PD-203	Appeal for relief from terms of order curtailing cooking, heating appliance production; re. L-23.
PD-205	Monthly report of makers of domestic laundry equipment.
PD-209	Vanadium allocations report.
PD-209-a	Monthly (by 20th) report of vanadium consumption and allocation request; re. M-23-a.
PD-209-b	Application for allocation of vanadium; re. M-23-a.
PD-210	Report on iridium inventories.
PD-211	Monthly report on iridium sales and transfers.
PD-212	Application for priority rating for material for smelters and refiners of specified metals; re. P-73.
PD-213	Monthly application for allocation of tin; re. M-43.
PD-214-a, PD-214-b, PD-214-c, PD-215	Request for permission to expand or construct oil producing facilities; re M-68-c (issued by Office of Petroleum Coordinator).
PD-216	Report of tire and tube stock.
PD-221	Inventory report to be filed by all owners (except warehouses) of iron or steel having more than 4% Cr; re. M-21-d.
PD-222-a	Application for instructions concerning contracts for imported material affected by order M-63.
PD-222-b	Certificate of copper scrap disposition; re. M-63.
PD-222-c	Application to import strategic materials; re. M-63.
PD-223	Purchaser's monthly application for toluene; re. M-34.
PD-224	Toluene producer's monthly schedule of proposed shipments; re. M-34.
PD-226	Copper scrap producer's monthly report.
PD-227	Copper warehouse report.
PD-228	Semi-annual report of steel producer operating under amendment No. 1, to order P-68.
PD-229	Appeal for relief from terms of tin conservation order M-43-a.
PD-231	Report of rubber consumption by product.
PD-234	Application for relief from terms of lead order M-38-c.
PD-235	Supplier's monthly report of inventories of jewel bearings and material; re. M-50.
PD-236	Consumer's monthly report on use of jewel bearings and materials; re. M-50.
PD-238	Customer's report of receipts of sodium nitrate.
PD-240	Customer's weekly report of wastepaper conservation.
PD-248	Report of purchases; re. P-73.
PD-248-a	Supplier's application; re. P-73.
PD-249	Monthly report by copper dealers under M-9-c and by tin and lead scrap dealers under M-72.
PD-251	Monthly report on asbestos building material; re. M-79.
PD-252	Monthly report on asbestos textiles and packaging, re. M-79.
PD-253	Same as PD-251 and 252, except it is filed only upon request.
PD-254	Consumers' form for tin and lead scrap; re. M-72.
PD-258	Request for copper mill priority serial number; re. P-106.
PD-261	Appeal for relief from copper order; re. M-9-c.
PD-262	Order for shipment of diphenylamine allocation.
PD-263	Diphenylamine producers monthly report.
PD-264	Iron and steel scrap delivery order.
PD-265	Report on tung, perilla and oiticica oil inventories.
PD-266	1941 diphenylamine consumption report.
PD-269	Appeal for relief from terms of tinplate order M-81.
PD-271	Hardship appeal for cashew nut oil allocation.
PD-275	National survey of 2nd quarter use and port.
PD-275	National survey of 2nd quarter use and 3rd quarter requirements of metals.
PD-277	Customer's form to accompany all orders to suppliers of products containing chlorine, except as in PD-190-a; re. M-19.
PD-282	Natural gas utility reduction report.
PD-283	Natural gas curtailment report; re. L-31.
PD-284	Report of farm equipment quotas.
PD-284-a	Producer's report of irrigation machinery production for farm equipment.
PD-285 Rev	Producer's application to apply A-3 rating for material for canning plant repairs; re. P-115.
PD-293	Corundum supplier's monthly report (by 10th); re. M-89.
PD-294	Corundum consumer's monthly report.
PD-295	Report of dealer and distributor of rhodium salts and plating solution concerning sales and deliveries; re. M-95.
PD-296	Rhodium plater's report on stocks; re. M-95.
PD-298	Monthly report on requirements of steel plates.
PD-299	Monthly report on consumption of steel plates.
PD-300	Ship repair priority assistance form.
PD-302	Report of rubber inventories.
PD-303-a	Monthly request of manufacturers for permission to accept delivery of graphite for crucible making, re. M-61.
PD-303-b	Monthly request of supplier for permission to deliver graphite, re. M-61.
PD-304	Application for rating for repair and maintenance; re. P-100.

Form No.	Description
PD-305....	Direction for relief of repair and maintenance restrictions; re. P-100.
PD-306....	Application for relief under repair and maintenance restrictions; re. P-100.
PD-307....	Weekly report of shot and bullet core steel producer; re. M-21-f.
PD-308....	Monthly report of purchaser of shot and bullet core steel; re. M-21-f.
PD-310....	Civilian application to local office of ODT for permission to purchase a commercial vehicle; re. M-100.
PD-311....	Foreign petroleum producer's application for priority assistance; re. P-98-a.
PD-312....	Application for authorization to use aluminum paint or pigment, (not required for retail distribution to consumer); re. M-1-g.
PD-313....	Monthly report (by 15th) of aluminum paint and pigment maker, formulator, and jobber; re. M-1-g.
PD-314....	Application for approval of sale of aircraft.
PD-315....	Application for priority assistance under chemical industry repair order; re. P-89.
PD-317....	Report of refrigerators on hand; re. L-5-b.
PD-318....	Jute processors initial report; re. M-70.
PD-319....	Appeal for relief from terms of jute order, M-70.
PD-321....	Washington approval of application by civilian for purchase of vehicle; re. M-100.
PD-322....	Form permitting sale of motor vehicle to Army, Navy, or foreign government.
PD-323....	Inventory report of track laying tractors.
PD-324....	Producer's unfilled order report on track laying tractors.
PD-326....	Report of deliveries of trucks and truck tractors; re. M-100.
PD-328....	Producer's inventory and sales of unapproved gas mask devices.
PD-330....	Manufacturers' report of rubber acquired for war orders, to be filed before rubber is used for a specific order; re. M-15-b.
PD-331....	Manila and sisal report; re. M-36.
PD-332....	Compounded latex report.
PD-333....	Requests for emergency repair assistance.
PD-339....	Shellac inventory report on April 1, 1942; re. M-106.
PD-335....	Monthly radio and phonograph production report; re. L-44.
PD-336....	Distributor's report on 19 kinds of supplies including rr. supplies in inventory; re. L-63.
PD-337....	Mechanical refrigerator inventory report.
PD-338....	Jewel bearing production and shipment report.

Form No.	Description
PD-339....	Importers and consumers quarterly inventory report on natural resins; re. M-56.
PD-340....	Producer's monthly report of track laying tractors.
PD-341....	Monthly report on rubber consumption; re. M-15-b.
PD-342....	Report of canner's production; re. M-86-a.
PD-343....	Report of canner's seasonal pack; re. M-86.
PD-344....	Appeal for printing ink; re. M-53. *See also P-94.*
PD-345....	Base period report on printing ink; re. P-94.
PD-346....	Steel warehouse report of aircraft steel stocks.
PD-351....	Rating application for railroad repair material; re. P-88.
PD-352....	Railroad repair inventory stock report; re. P-88.
PD-353....	Application for forging steel requirements.
PD-354....	Report of inventories of certain high lauric acid oils, to be filed by April 15, re. M-60.
PD-355....	Report on palm oil inventories; re. M-59.
PD-356....	Annual report of iron and steel in matresses; re. L-49.
PD-357....	Quarterly report of iron and steel in mattresses; re. L-49.
PD-358....	Monthly molybdenum application for melting; re. M-110.
PD-359....	Monthly request for molybdenum; re. M-110.
PD-360....	Customers form to accompany all purchase orders for molybdenum, re. M-110.
PD-361....	Seller or consumer monthly glycerin report; re. M-58.
PD-362....	Users report of glycerin; re. M-58.
PD-363....	Refiner or producer's glycerine delivery schedule; re. M-58.
PD-367....	Information for appeal to motor fuel order, L-70.
PD-369....	Motor fuel supplies delivery report; re. L-70.
PD-370....	Electrical appliance inventory report.
PD-371....	Application by aluminum or magnesium fabricator or producer for priority certificate serial number, re. P-120.
PD-372....	Aluminum and magnesium plants quarterly reports; re. P-120.
PD-376....	Stocks and sale of loose industrial diamonds; re. M-109.
PD-377....	Report of sale or transfer of industrial diamonds; re. M-109.
PD-378....	Monthly sales report on industrial diamonds; re. M-109.

Form No.	Description
PD-379	Production report on farm equipment; re. P-95.
PD-380	Antimony inventory and requirements; re. M-112.
PD-381	Application for monthly antimony allocation; re. M-112.
PD-382	Dealers and wholesalers rifle, pistol and shotgun inventory; re. L-60.
PD-383	Affidavit stating whether dealer will sell new firearms to government; re. L-60.
PD-384	Consumer cork inventory for crown caps; re. M-8-a.
PD-385	Orders for lift trucks and repair parts.
PD-386	Report of molybdenum distribution; re. M-110.
PD-390	Inventory report under rapeseed oil order; M-77.
PD-391	Alloy steel melting schedule.
PD-391-a	Monthly summary of alloy steel melting schedule, filed by 1st of month.
PD-393	Monthly zinc inventory and delivery report; re. M-11.
PD-394	Nickel scrap segregation; re. M-6-c.
PD-395	Canadian deliveries.
PD-397	Application for liquified gas equipment; re. L-86.
PD-399	Application for rating for air conditioning or refrigeration repairs; re. P-126.
PD-400	Application for quotas of mine repair parts; re. P-56.
PD-402	Safety razor and blade report form; re. L-72.
PD-403	Consumption report under rubber "E" list.
PD-406	Housing remodeling report; re. M-133, P-110.
PD-407	Application for rubber for list "F" products.
PD-409	Rolling mill facility report for steel; re. M-21.
PD-412	Heater and ventilator manufacturers' application for release of frozen copper.
PD-413	Dairy processers and suppliers repair report of applied ratings; re. P-118.
PD-414	Dairy processers and suppliers application to apply ratings; re. P-118.
PD-415	Authorization application for heavy compressors; re. L-100.
PD-416	Compressor monthly delivery application; re. L-100.
PD-417	Appeal to domestic electric range order; re. L-23-b.
PD-418	Dry cleaning and laundry application form for purchases; re. L-91.
PD-419	Dry cleaning and laundry equipment monthly report of orders, shipments, and production; re. L-91.
PD-420	Authorization to purchase heavy compressors; re. L-100.
PD-423	Authorization to manufacture certain plumbing fixtures; re. L-42, L-79.
PD-424	Application for industrial power in areas where power use is curtailed; re. L-94.
PD-426	Request for exceptions to amended copper order; re. M-9-c.
PD-427	Application for refrigerator Certificate of Transfer; re. L-5-d.
PD-428	Certificate of Transfer for refrigerators frozen in stock; re. L-5-d.
PD-429	Certificate of Transfer cancellation; re. L-5-d.
PD-430	Authorization to move frozen refrigerators from one storage place to another with or without transfer of title; re. L-5-d.
PD-431	Frozen refrigerator inventory as of June 15 and subsequent sales; re. L-5-d.
PD-432	Report of refrigerator sales between Feb. 14 and June 15; re. L-5-d.
PD-434	Naphthalene allocation application; re. M-105.
PD-435	Naphthalene allocation application; re. M-105.
PD-436	Naphthalene producers' and distributors orders; re. M-105.
PD-437	Appeal to iron and steel conservation order; re. M-126.
PD-438	Monthly inventory and production report of naphthenic acids; re. M-142.
PD-439	Consumer's request for delivery and inventory of naphthenic acids; re. M-142.
PD-444	Steel warehouse report of ship repair stocks; re. M-21-m.
PD-445	Power crane and shovel inventory report; re. L-82.
PD-446	Power crane and shovel proposed production schedule; re. L-82.
PD-447	Monthly report on used rails and rail joints; re. L-88.
PD-448	Application for release from restrictions of power crane and shovel order, L-82.
PD-449	Application for materials for incendiary bombs; re. L-115.
PD-450	Zinc monthly allocation, dealers form; re. M-11.
PD-459	Copper scrap for foundries; re. M-9-b.
PD-463	Specifications for tire castings.
PD-464	Pool of zinc sulphide pigments; re. M-128.
PD-466	Indian Kyanite; re. M-143.
PD-468	Inventories and consumption of rubber tires on hand trucks; re. L-111.
PD-481	Application for sperm oil under allocation system; re. M-40.
PD-482	Sperm oil inventory to be filed by June 15; re. M-40.
PD-484	Quartz crystal inventories to be filed by 20th of each month; re. M-146.
PD-485	Quartz crystal sales and imports to be filed within 10 days after transaction.
PD-487	Application for tantalum; re. M-156.
PD-488	Report of tantalum requirements by 20th of preceding month; re. M-156.
PD-489	Monthly report by 27th of use of tantalum ores and concentrates; re. M-156.
PD-499	Survey of June 2 stocks of fluorescent lighting parts of manufacturers and distributors.
PD-T	Trailer makers' application for priority assistance under PRP.
PC-20	Application for preference rating under Army-Navy Munitions Board system.

Relief From "M" and "L" Orders

Principal grounds recognized by the WPB for granting appeals from materials and limitation orders

1 IF the granting of an amount of scarce material will hasten the firm's conversion to war production, permission may be granted to accelerate its production or scarce material consumption to cover up to 120 per cent of the firm's quota as set by the order for the period required for conversion, if such conversion is to be 80 per cent or more and will proceed without substantial interruptions.

If conversion will be speeded, a firm may be allowed to produce replacement parts or other articles that will be needed for essential civilian products during any period up to three years after the effective date of the appeal decision, provided conversion to war production is to be 80 per cent or more, and if it is not feasible to have such replacement parts made by other firms.

If conversion will be quickened, permission to finish semi-fabricated inventory on hand will be granted if such inventory will be a serious impediment to conversion to war production, or cannot be retained, used or sold for other purposes without serious financial loss, and will require only relatively small amounts of scarce material for its completion and no satisfactory substitutes for such material can be found to manufacture relatively essential end-products.

2 TO hold personnel organization intact; to take over the quota or obligations of another firm which is converting to war production, if WPB approves; to produce or acquire any equipment or supplies which will facilitate the firm's conversion needed to carry out any other action in accord with the foregoing.

3 IF conversion will be facilitated by the granting of an amount of scarce material that will not exceed the amount that will be saved in one year by the conversion, an appeal may be granted if it be shown that simplification or substitution will result in the saving of substantial amounts of scarce materials in the making of an essential civilian product. The same bases for appeal may be set forth which are indicated in Item 1.

4 IF a limitation order would impose exceptional or unreasonable hardship upon a firm's production of essential civilian products, it may be shown that at the time of the order's issuance the firm did not exist and, therefore, could not limit its production on the basis of a period when it was not doing business. Or it may be shown that during the base period of the order, upon which production was to be limited, the firm experienced subnormal operations because of non-economic reasons such as fire, flood, construction, etc.

Relief may be granted from the terms of a limitation order which restricts certain materials, if a company can show that its production during the base period designated in the order was confined largely to types of product, or involved the use of substantial quantities of raw materials, not covered by the order.

Relief may likewise be given if it be shown that the amount of scarce material the firm requests is either exceptionally small or cannot be replaced by a substitute material without unreasonable expense or expenditure of other materials.

Any other circumstances may be set up to show that the order will cause exceptional and unreasonable hardship to the firm because of undue competitive advantage to other companies making the same product. However, a company must show that its operations during the base period were in reasonable accord with WPB objectives.

5 UNEMPLOYMENT which an order may cause is adequate ground for granting an appeal if the amount of scarce material consumed per man-hour is relatively small, and if the workers involved are not suitable for other employment, or cannot find other jobs within a reasonable time. It may be further shown that the resulting unemployment will cause the loss of skills or crafts that are deemed by WPB too important to be sacrificed.

6 AN appeal may be granted if it is shown that substantial competitive inequities arose from lack of uniformity in the administration of orders, or incorrect reports connected therewith, or to permit a company to take any action which is in full accord with the intent of an order but was inadvertently prohibited by it.

7 IF the making of certain replacement parts or supplies is deemed to be non-essential to the United States, but proper authorities have said they are desirable for export to create foreign exchange or for other reasons, an exception may be granted.

Also a firm may be permitted to take any other action deemed by proper authorities to be necessary to lend-lease or other economic programs—the acquisition of excess inventory of scarce materials, or the exceeding of production quotas for export purposes.

"E" Orders

E-1.....Machine tool distribution controls established (3-28-41). Supplement No. 1 (7-7-41) lists group classification. *Superseded by E-1-a.*

E-1-a...Revises Master Preference Numerical list. *Supersedes E-1. Suspended 1-7-42.*

E-1-a Rev. Contains revised Master Preference Numerical list; gages and chucks included; complete priority control established. (1-15-42). *Supersedes E-1-a.* Amendment No. 1 (3-26-42) excludes drill chucks from order and clarifies order.

E-1-b...Limited allocation system on machine tool production and delivery (4-30-42). Related forms: PD-1-a, PD-3, PD-3-a, and PD-4. *Expires when revoked.*

E-2.....Cutting tools. Amendment (7-25-41). *Revoked by E-2-a (7-17-41).*

E-2-a...Controls distribution of cutting tools (8-28-41). *Revokes E-2.*
Amendment (11-29-41) additional items added to list.

E-3.....Allocates tools for United Kingdom (1-12-42). *Expires July 1, 1942.*

E-4.....Allocates distribution of second-hand machine tools (2-3-42). *Expires when revoked.*

Priority Regulations

No. 1...Regulations affecting acceptance of priority orders and inventories (8-27-41). Amended (1-23-42) to make mandatory the acceptance of all rated orders; other changes announced. Amended (5-2-42) to add several countries whose government orders are defined as "defense orders."

No. 2...Makes mandatory the acceptance of all rated orders issued by E. R. Stettinius, Jr. (9-9-41).

No. 3...Revises procedure for using forms PD-1 to PD-5; authorizes use of new forms PD-1a and PD-3a (1-12-42).

No. 4...Validates priority certificates issued by Donald M. Nelson (1-26-42).

No. 5...Explains procedure and restrictions on reproduction of forms (2-5-42).

No. 6...Abolishes Priorities Critical List, subject to restrictions of individual priority orders (2-11-42).

No. 7...Permits use of facsimile signature for endorsing and extending orders, subject to specified conditions (2-17-42).

No. 8...Abolishes certain reporting requirements, largely in connection with producers' monthly reports of extension of ratings (3-17-42).

Amendment No. 1 (3-19-42) restores requirements that reports be filed with order P-56, and eliminates filing reports with P-56-a.
Amendment No. 2 (5-5-42) discontinues reports required by construction project rated orders P-19, P-19-a, P-19-e, and P-19-h.

No. 9...Explains new system for assigning preference ratings to export orders. Related form: PD-311 (4-25-42).

Miscellaneous Orders

General Metals Order No. 1. (Terminated September 23, 1941. Restrictions imposed covered by Priorities Regulation No. 1).

Special Allocation No. 1 — Directs certain machine tool builders to accept specified orders for Russia (11-11-41).

General Allocation Order No. 1—Steel Plates (11-29-41). *See M-21-c.*

Directive No. 3..Calls for re-negotiation of all "open-end contracts" held by government agencies (5-14-42).

Directive No. 4..Formalizes procedure in placing orders for machine tools specified for export by Machine Tool Subcommittee.

• • •

Production Requirements Plan

• • • The Production Requirements Plan, as set up by General Preference Order P-90, has been designed by the WPB to simplify the priority system through the "End Use Code," or as later termed, the "Allocation Classification" system. This system provides a ready, convenient, and complete means of identifying the sub-divisions of the entire war production program, showing the ultimate destination of materials and products and permitting the transmission of the identity of such products or materials down through industry from the prime contractor to the most remote supplier of materials.

The system does not indicate the order of importance of the products or materials, and the symbols assigned to the various phases of industry have no relation to their order of importance. These symbols merely set up an orderly classification of all classes of products and production enterprises.

Allocation Classification

Purpose and General Instructions

I. **Purpose**

The purpose of the Allocation Classification is:

(1) To obtain standardization and reduce the number of differing forms for allocation purposes that industry now must submit to the War Production Board.

(2) To furnish information needed by the War Production Board in the allocation of materials.

To allocate intelligently, it is necessary to know the sub-divisions of the war, industrial and civilian progress for which materials are going to be used. For example, it is essential to know whether the material is going to tanks, or destroyers, or railroads, or to office machinery and supplies in order to determine allocation policy.

The function of the Allocation Classification numbers is *not* to indicate order of importance but is merely to provide a convenient means—

(1) of identification of the sub-divisions of the program for which the products or materials ordered are destined;

(2) of transmitting such identification on down through industry to the original suppliers of the material.

II. What Each Business Should Do

In general terms, every purchase order is to carry its allocation symbol.

There are two principal kinds of situations to distinguish in selecting the proper symbol:

(1) The business of the purchaser may fall directly into one or more of the Allocation Classifications. In this case the business simply places on its purchase order the symbol representing the business for which the purchase order is placed.

For example, the manufacturer of tanks places the symbol 3.10 on all its purchase orders. The truck manufacturer uses 10.20. A railroad uses 10.10.

The business of the purchaser does not fall directly into any of those classes. In this case, the purchaser simply transmits the symbols it receives on the purchase orders which its customers have placed with it.

For example, the manufacturer of electric motors receiving an order from a railroad bearing the symbol 10.10 places the same symbol, 10.10, on its purchase order.

Mixed cases are covered in the instructions.

Once a business has determined in which situation it finds itself, it should then place the proper symbol or symbols on every purchase order which it issues.

III. General Instructions for Use of the Allocation Classification

(1) Each business should first determine whether or not its operations fall directly into one or more

of the allocation classifications listed or whether it should use the Allocation Classification numbers that are on the orders which it receives from its customers.

To determine this, each business should consult the Specific Instructions and the detailed Classified or Alphabetical Lists. These should furnish the necessary information to enable each business to classify its operations properly.

(2) Each business directly falling in any class should consult the "Specific Instructions" covering its class for any special instructions that may apply to that class alone.

For the Specific Instructions referred to in the above paragraph, see THE IRON AGE. *The full text of these instructions is appearing serially in* THE IRON AGE, *Section One, beginning with this (the June 4) issue.*

(3) Where the operations of a business fall directly into one or more Allocation Classifications:

a. Any business whose operations fall directly into *one* Allocation Classification should place its classification number on all purchase orders that it issues regardless of what they are for. For example, a railroad ordering metal-working machinery would classify the order under Railroad (10.10) despite the fact that metal-working machinery is a separate classification.

b. Any business whose operations fall directly into *two or more* Allocation Classifications should place on its purchase orders the percentage division between the sales for the latest available month. For example, a company engaged in the manufacture of household furniture and office furniture should place on its orders 16.00—6%, 19.00—4%.

(4) Where the operations of a business do not fall directly within any of the listed classifications (for example, parts and sub-assemblies such as electric motors, air compressors, ball bearings, etc.):

a. Where each item on the purchase order can be traced directly to one Allocation Class, the business should transmit the Allocation Symbol for that item on its purchase orders. For example, a storage battery company orders materials to be used in the manufacture of storage batteries for automobiles, the symbol for automobiles (10.20) should be placed on the purchase order.

b. Where each item on the purchase order can be traced to two or more Allocation Classes, the business should transmit on the purchase order for that item the percentage division between Allocation Classes based on the dollar volume of its sales using the latest available month as the base period. The following principles should be followed in doing this:

1. Where the business falling under any one Allocation Sub-class comprises 5% or more of the total business, that symbol and its percentage is transmitted on the purchase order.

2. Where the business falling under any one Allocation Sub-class is less than 5% of the total dollar volume and can be grouped with other Sub-classes falling under one main Allocation Classification, it should be combined. For example, a percentage division might be: Class 5.10—Ammunition 20 mm. and above—3%, Class 5.20—Ammunition, small arms below 20 mm.—4%. Since both 5.10 and 5.20 are sub-divisions of the main Class 5.00, the two should be combined under the main class and reported as: 5.00—7%.

3. After combining the sub-divisions under any one *main* classification, if the main Allocation Classification still totals less than 5%, this portion of the business should be pro-rated over the classifications which are 5% or more.

(5) Where certain operations of a company fall directly into several listed classifications while other operations do not fall directly under any listed classifications, purchase orders for the listed business should be handled as described in section (4).

(6) Retail purchasers, purchases by retailers, and purchases by distributors for resale to retailers will not transmit an Allocation Symbol on their orders. Since neither the retailer nor the distributor places an Allocation Symbol on their orders, the business receiving these orders will classify them according to its own Allocation Symbol.

(7) In addition to the information required in respect to Allocation Classifications, the War Production Board will still have need of the information which is already being furnished as to whether the orders are placed by the Army, the Navy, etc. This will be continued and slightly extended. A series of symbols has been adopted to indicate the purchaser.

Classifying Operations Under the New Plan

• • • If any business is in doubt as to how it should classify its operations and transmit the classification symbols to its suppliers, it should get in touch with the War Production Board at the nearest Field Office or in Washington, D. C. See pages 4 and 5 of The Iron Age Priorities Guide for locations of WPB field offices.

Purchaser	*Symbol*
The Army	USA
The Navy—(Includes Maritime Commission)	USN
Lend-Lease	LL
Other Foreign Purchasers	FP
Domestic Purchasers	DP

When Orders bearing these symbols are received by a business, the business must pass them on to its suppliers even though the Allocation Symbol may be changed.

These symbols should in all cases precede the Allocation Symbol numbers placed on purchase orders so that the Allocation Classification will be broken down by Army, Navy, Lend-Lease, etc.

The same instructions for transmission apply to these symbols as to the Allocation Classification Symbols.

(8) It is essential that these classifications should be applied not only to all orders to be placed in the future but also to existing orders that have already been placed. To do this, it is the responsibility:

(a) Of each business that falls directly into one or more Allocation Classification to review the orders that it has already placed and advise each of its suppliers as to just what Allocation Symbol or symbols should be applied.

(b) Of each business that does not fall directly into one of these classifications (i.e., manufacturers of Parts, and Sub-assemblies) to transmit to all its suppliers with whom purchase orders have been placed the Allocation Symbols that it receives from its customers.

(c) Of the Army and Navy procurement officers and of the Maritime Commission to advise their Prime Contractors as to what Allocation Symbol should be applied to the purchase orders that these services have already placed with them.

Allocation Classification Symbols

Military

Allocation Symbol

Class 1.00—Aircraft—Production and Maintenance (complete except for armament and ammunition—as approved by the Joint Aircraft Committee).

Class 2.00—Ships, Production and Maintenance (complete except for armament and ammunition).

2.10 Battleships.
2.20 Aircraft Carriers.
2.31 Escort Vessels (aircraft), combat, loaded transports, and combat loaded cargo ships.
2.32 Patrol Vessels.
2.33 Landing craft including the following types: APM, ATL, YTL, tank lighters, artillery lighters, landing boats, support landing boats.
2.40 Light Cruisers.
2.50 Destroyers, including escort vessels.
2.60 Submarines.
2.70 All other types of naval craft.
2.80 Repairs to all naval vessels.
2.90 Ships for Maritime Commission.

Class 3.00—Vehicles—Production and Maintenance (complete except for armament and ammunition).

3.10 Tanks and armored vehicles—all types.
3.20 Vehicles, except rail—all other military types.

Class 4.00—Armament and Weapons—Production and Maintenance (complete with mounts and related equipment).

4.10 Aircraft.
4.20 Anti-aircraft, Barrage Balloon Equipment, A. A. Searchlights.
4.30 Artillery, including railway and sea coast.
4.40 Fire control, all types.
4.50 Machine guns—ground, hand arms.
4.60 Naval, all types.
4.70 Tanks and anti-tank.
4.90 Weapons of all other types.

Class 5.00—Ammunition—Production and Maintenance (complete items).

5.10 Ammunition, 20 mm. and above.
5.20 Ammunition, small arms below 20 mm.
5.30 Bombs, depth charges, mines, and torpedoes.
5.40 Propellants, chemicals, explosives.
5.50 Pyrotechnics.

Class 6.00—War Equipment and Supplies—Production and Maintenance (complete with related equipment).

6.10 Chemical Warfare equipment and supplies.
6.20 Clothing, general supplies and subsistence.
6.30 Mapping, Map Reproduction and photographic equipment.
6.40 Medical equipment and supplies.
6.50 Military field construction equipment.
6.60 Military radio and wire communications, and Radar or electronic equipment—all types.
6.70 Military railway, including rail vehicles and bridge equipment.
6.80 Supplies and equipment—all other military types.
6.90 Supplies and equipment—all other.

Class 7.00—War Facilities—Construction and/or Maintenance.

7.10 Air Fields, Bases, Camps, Coast Defense, Depots, Forts, Navy Yards, Posts, Stations—Continental U.S.A.
7.20 Air Fields, Bases, Camps, Coast Defense, Depots, Forts, Navy Yards, Posts, Stations—outside Continental U.S.A.
7.30 Munitions manufacturing facilities and proving grounds—government owned.
7.40 Panama Canal.
7.50 Shipyards and ship repair facilities—government owned.

Industrial and Civilian

Allocation Symbol

Class 8.00—Raw Materials, Production and Processing of.

8.10 All Metals, Production (including mining), Smelting and Processing of.
8.20 All Chemicals, Production and Processing of.
8.90 All other Raw Materials, Production and Processing of.

Class 9.00—Power, Light, and Heat.

9.10 Electricity.
9.20 Petroleum.
9.30 Coal and Coke.
9.40 Gas.

Class 10.00—Transportation.

10.10 Railroad, including Urban and Interurban.
10.20 Automotive.
10.30 Roads, Streets, etc., Construction and Maintenance of.
10.40 Water Transportation, including construction of privately owned shipyards.
10.50 Air Transportation.
10.90 All Other Transportation.

Class 11.00—Communication.

11.10 Telephone.
11.20 Radio.
11.30 Telegraph.
11.90 All Other Communication.

Class 12.00—Public Health and Safety.

12.10 Sanitary & Health Systems & Facilities.
12.20 Health Equipment and Supplies, including Personal Care.
12.30 Public Safety Equipment and Supplies.

Class 13.00—Agricultural Equipment and Supplies.

Class 14.00—Industrial Food Processing.

Class 15.00—Wearing Apparel.

Class 16.00—Equipment and Supplies for Household Use.

Class 17.00—Education and Information.

17.10 Printing and Publishing.
17.20 Education.

Class 18.00—Recreation and Amusement.

Class 19.00—Equipment and Supplies for Office Use.

Class 20.00—Machinery and Equipment for Industrial Use.

20.10 Metal-working machinery.
20.20 All other—including Mine, Construction, Special & General Industrial.

Class 21.00—New Buildings, Construction of.

21.10 Buildings for Manufacturing and Commercial Purposes, Construction of.
21.20 All Types of Dwellings, Construction of.
21.90 All Other Types of Buildings, Construction of.

Class 22.00—Operating Supplies and Building Repair & Maintenance.

Class 23.00—All Other End Uses—(excludes all subassemblies and parts going into finished products coming with the other classes).

PRICE SCHEDULES

The following table indicates in simplified reference form the status of price schedules and maximum price regulations which remain in effect covering metal working industries, and shows the class of sellers generally covered and the approximate price level determined by the schedule:

No. of Price Schedule or Maximum Price Regulation	Commodity or Product	Class of Seller Affected	Approximate Price Level
No. 1	Second hand machine tools	All sellers	Percentage of March 1, 1941, list price of new tool
No. 2	Aluminum scrap and secondary aluminum ingots	All sellers	Prices listed in schedule
No. 3	Zinc scrap and secondary slab zinc	All sellers	Prices listed in schedule
No. 4	Iron and steel scrap	Dealers and brokers	Prices listed in schedule
No. 6	Iron and steel products	Producers	April 16, 1941
No. 8	Pure nickel scrap monel metal scrap, stainless steel scrap, nickel steel scrap, and other scrap materials containing nickel; secondary monel ingot, secondary monel shot, and secondary copper-nickel shot	All sellers*	Prices listed in schedule
No. 10	Pig iron	Producers	Prices listed in schedule
No. 12	Brass mill scrap	All sellers	Prices listed in schedule
No. 15	Copper	All sellers*	Prices listed in schedule
No. 17	Pig tin	All sellers	Prices listed in schedule
No. 20	Copper and copper alloy scrap	Sellers to consumers	Prices listed in schedule
No. 21	Formaldehyde	All sellers	Prices listed in schedule
No. 28	Ethyl alcohol	Manufacturer	Prices listed in schedule
No. 29	By-product foundry, by-product blast furnace coke	All sellers	Prices listed in schedule
No. 31	Acetic Acid	All sellers	Prices listed in schedule
No. 36	Acetone	All sellers	Prices listed in schedule
No. 37	Normal butyl alcohol	All sellers	Prices listed in schedule
No. 38	Glycerine	All sellers†	Prices listed in schedule
No. 40	Builders' hardware and insect screen cloth	All sellers except retail	Oct. 1-15, 1941
No. 41	Steel castings	Producers	July 15, 1941
No. 43	Used steel barrels or drums	All sellers	Prices listed in schedule
No. 46	Relaying rail	All sellers	Prices listed in schedule
No. 49	Resale of iron or steel products	Jobbers or warehouse men	April 16, 1941
No. 63	Retail prices for new rubber tires and tubes	Retail sellers	Prices listed in schedule
No. 64	Domestic cooking and heating stoves	Manufacturers	Mid-Oct., 1941
No. 66	Retreaded and recapped rubber tires, the retreading and recapping of rubber tires, and basic tire carcasses	All sellers	Prices listed in schedule
No. 67	New machine tools	All sellers	Oct. 1, 1941
No. 69	Primary lead	All sellers	Prices listed in schedule
No. 70	Lead scrap materials; secondary lead including calking lead; battery lead scrap; and primary and secondary antimonial lead	All sellers	Prices listed in schedule
No. 71	Primary and secondary cadmium	All sellers	Prices listed in schedule
No. 75	Dead-burned grain magnesite	All sellers	Prices listed in schedule
No. 77	Beehive oven furnace coke produced in Pennsylvania	Sellers to consumers	Prices listed in schedule
No. 78	Oxalic acid	All sellers†	Prices listed in schedule
No. 79	Carbon tetrachloride	All sellers†	Prices listed in schedule
No. 81	Primary slab zinc	All sellers*	Prices listed in schedule
No. 82	Wire, cable and cable accessories	Manufacturers	Oct. 15, 1941
No. 83	Radio receiver and phonograph	Manufacturers	Oct. 15, 1941
No. 84	Radio receivers and phonograph parts	Manufacturers	Oct. 15, 1941
No. 85	New passenger automobiles	All sellers	Prices listed in schedule
No. 86	Domestic washing machines and ironing machines	Manufacturers	Oct. 1-15, 1941
No. 93	Mercury	All sellers	Prices listed in schedule
No. 96	Domestic fuel oil storage tanks	All sellers	Prices listed in schedule
No. 98	Titanium pigments	All sellers†	Prices listed in schedule
No. 100	Cast iron soil pipe and fittings	Manufacturer, jobber, wholesaler	Prices listed in schedule
No. 102	Household mechanical refrigerators	Manufacturer	Dec. 2, 1941-Feb. 2, 1942
No. 105	Gears, pinions, sprockets and speed reducers	All sellers*	Oct. 15, 1941
No. 110	Resale of new household mechanical refrigerators	Retailers and wholesalers	Prices listed in schedule
No. 111	New household vacuum cleaners	Retailers and wholesalers	Prices listed in schedule
No. 113	Iron ore produced in Minnesota, Wisconsin and Michigan	All sellers	1941 shipping season
No. 120	Bituminous coal	Sales at the mines	Oct. 1-15, 1941
No. 121	Miscellaneous solid fuels delivered from producing facilities	Producer	Dec. 15-31, 1941
No. 122	Solid fuels delivered from facilities other than producing facilities	Dealers	Dec. 15-31, 1941
No. 124	Rolled zinc products	Producer and manufacturer	Prices listed in schedule
No. 125	Non-ferrous foundry products	All sellers	Oct. 1-15, 1941
No. 126	Fluorspar	Producers	Jan. 2, 1942
No. 133	Farm equipment (retail prices)	Retailers	Manufacturer's price list effective during or prior to March, 1942
No. 134	Construction and road equipment (rental prices)	All persons	Rentals listed in schedule
No. 136	Machines and parts	All sellers	Oct. 1, 1941
No. 138	Standard ferromanganese	All sellers	Prices listed in schedule
No. 139	Used household mechanical refrigerators	Sellers to consumers	Prices listed in schedule

*Certain sales to the Government excepted.
†Quantity limitations.

The following temporary price regulations have been specifically revoked, effective May 11. The commodities are subject to the General Maximum Price Regulation:

Temporary Regulation	Commodity
No. 12	Domestic washing machines and iron machines—distributors and retailers
No. 13	Resale of new domestic cooking and heating stoves and ranges
No. 14	Resale of new radio receiving sets and phonographs—distributors and retailers
No. 15	New typewriters
No. 17	Plumbing fixtures
No. 18	Domestic electrical appliances
No. 19	Oil paints and varnish

Permanent maximum price regulations are established for the following commodities previously covered by informal price actions issued by OPA:

Regulation No.	Commodity
124	Rolled zinc products
125	Non-ferrous foundry products
126	Fluorspar
129	(Certain paper and paper products)
131	Standard newsprint

The following commodities now covered by informal price actions will come under the General Maximum Price Regulation:

Building Materials:	High tension porcelain insulators Basic refractory brick
Chemicals, Drugs and Paints:	Dry colors (Western differential only) Copper sulphate, cotton linters, lead pigments, light oils, coal tar derivatives
Copper and Brass:	Brass and bronze alloy ingots
Iron and Steel Products:	Gray iron castings
Zinc, Lead and Tin:	Antimony, zinc oxide, zinc dust, zinc alloys, bonded abrasive products, lead products and coated abrasives
Consumers' Durables:	All products covered by informal actions
Fuels:	Industrial lubricating oils and greases